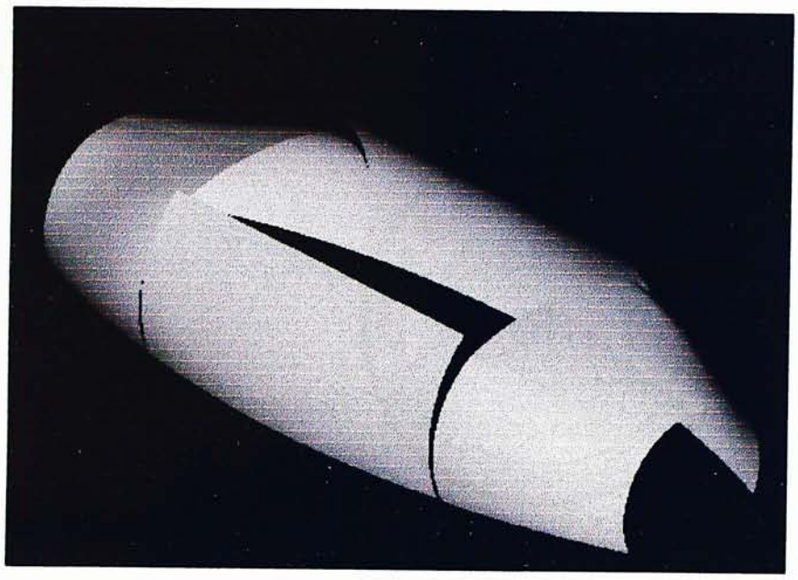
**ARCHITECTURE DEPARTMENT** **CHINESE UNIVERSITY OF HONG KONG**

MASTER OF ARCHITECTURE PROGRAMME 1997-98 DESIGN REPORT

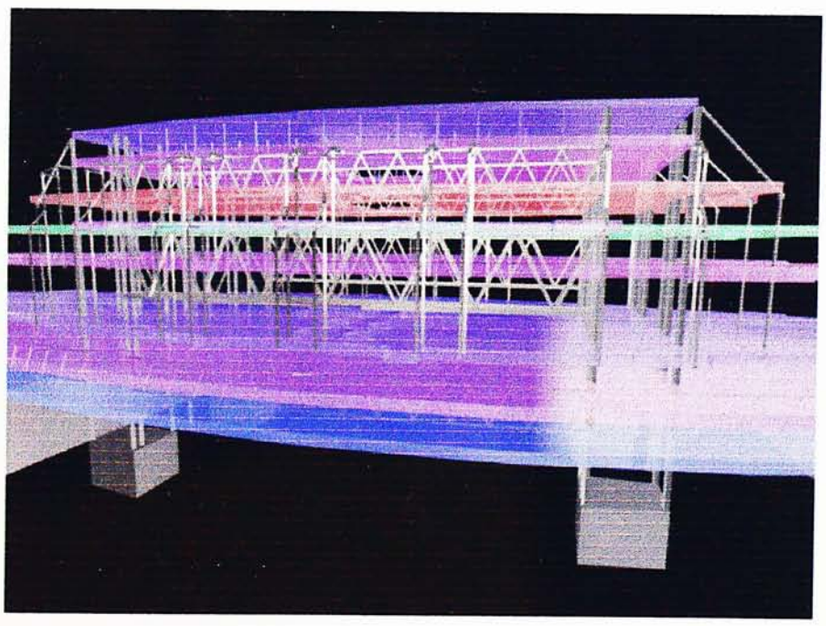
# LOK MA CHAU BUSINESS CONGRESS CENTER

MA Yu Cheung April 1998



**Lok Ma Chau Business Congress Center**

**Prepared By**
**Ma Yu Cheung**
**Of**
**The Chinese University Of Hong Kong**



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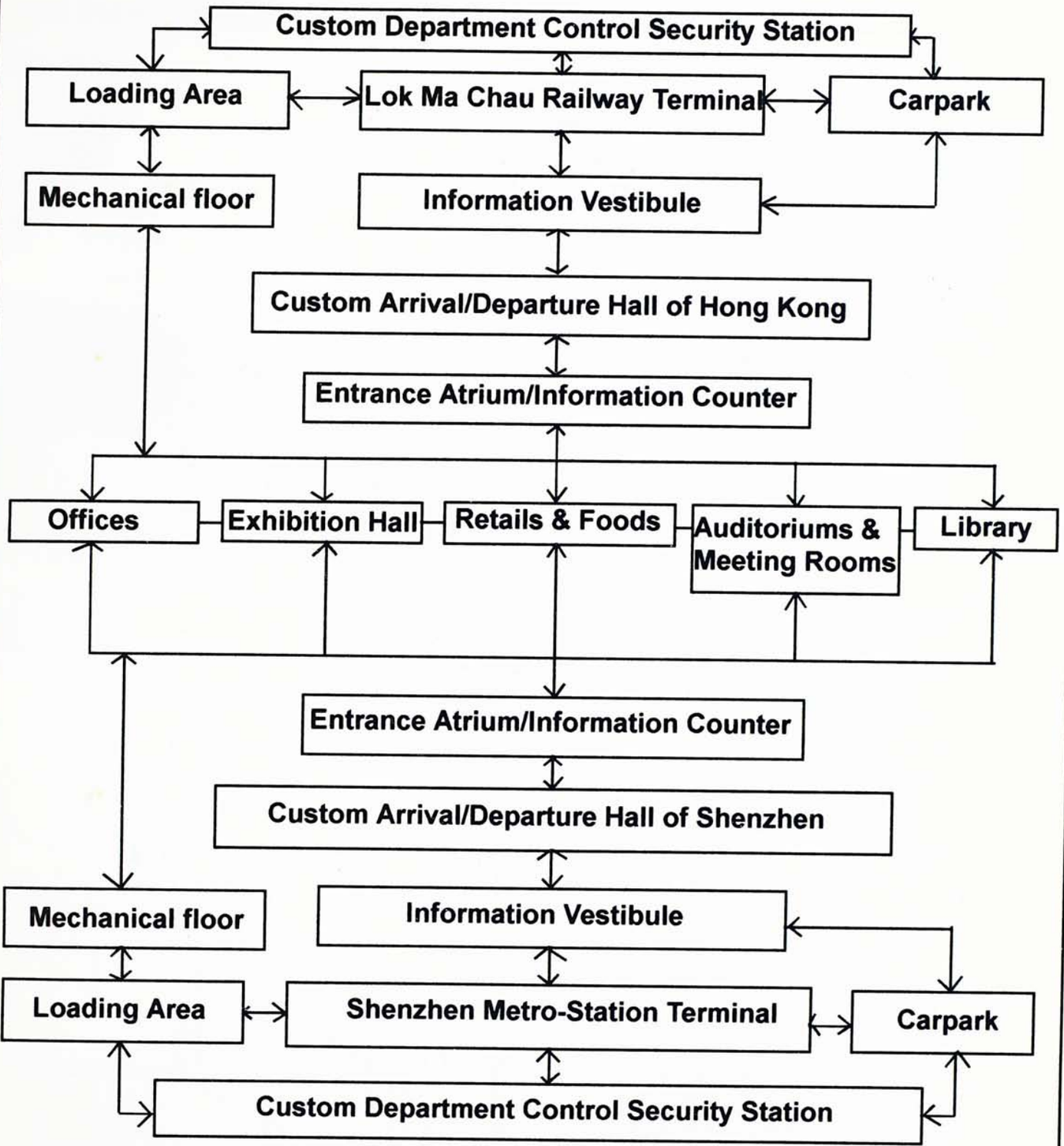
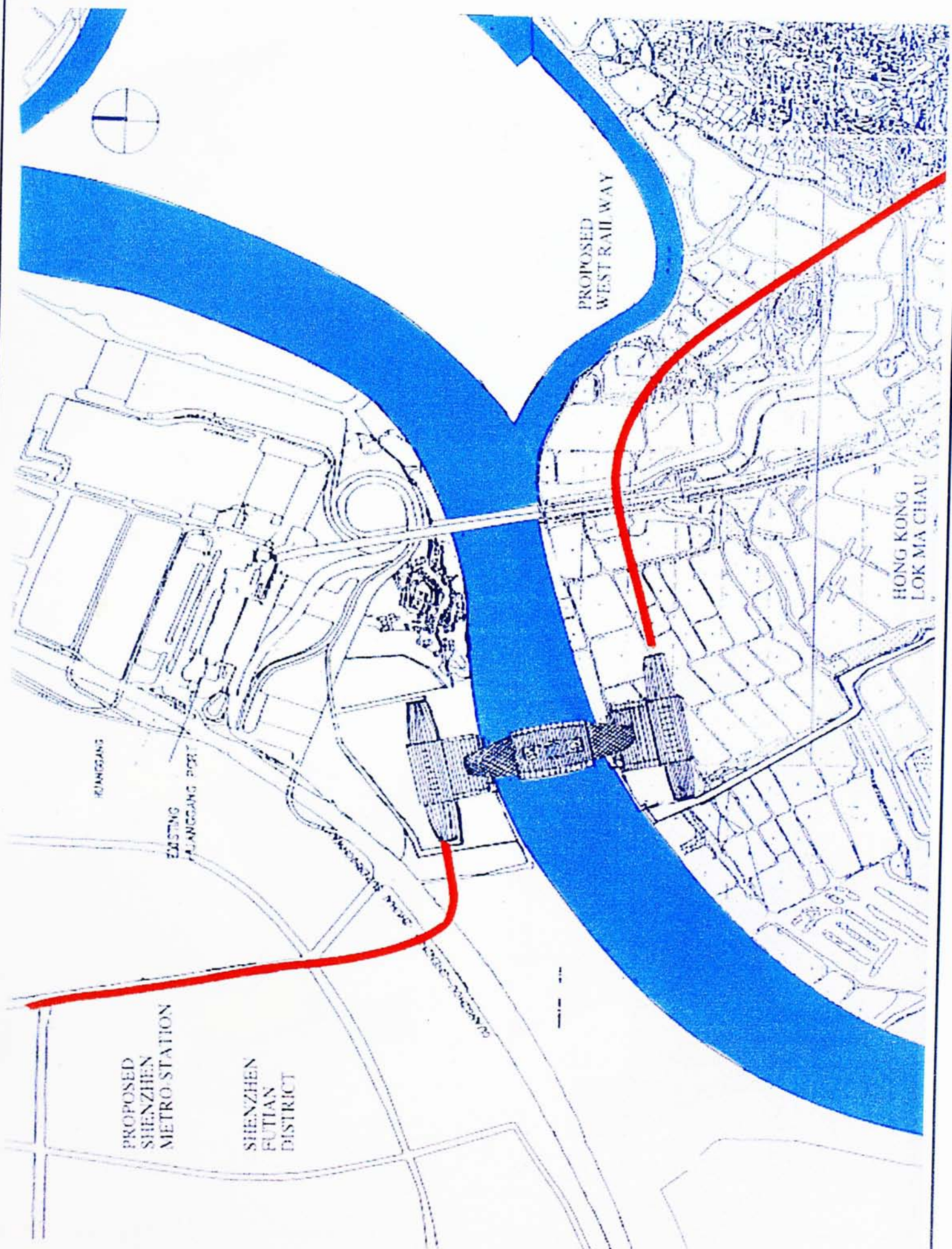
# Content

**Spatial Relationship Diagram**



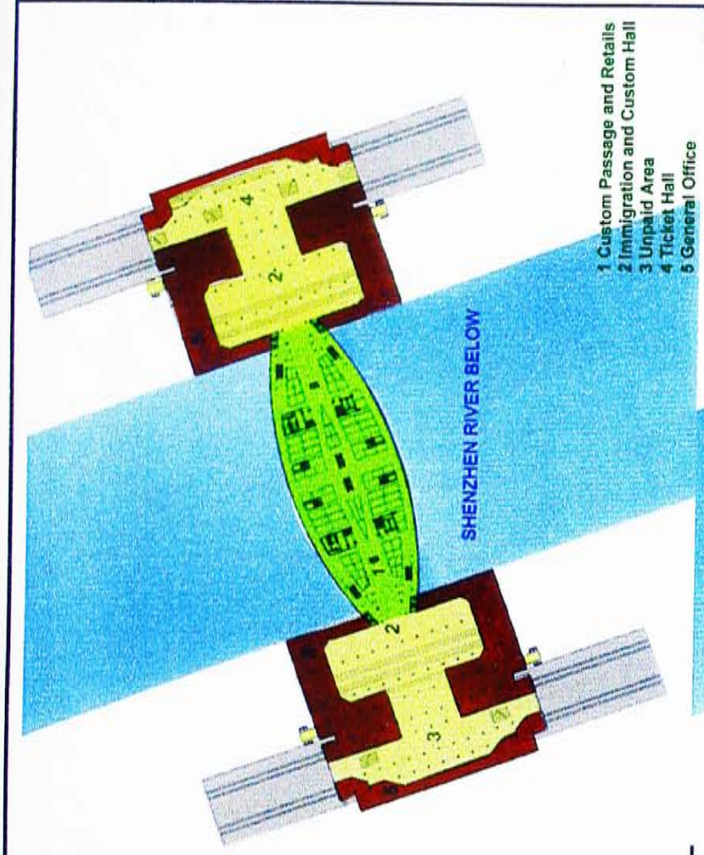
## Final Design Solutions

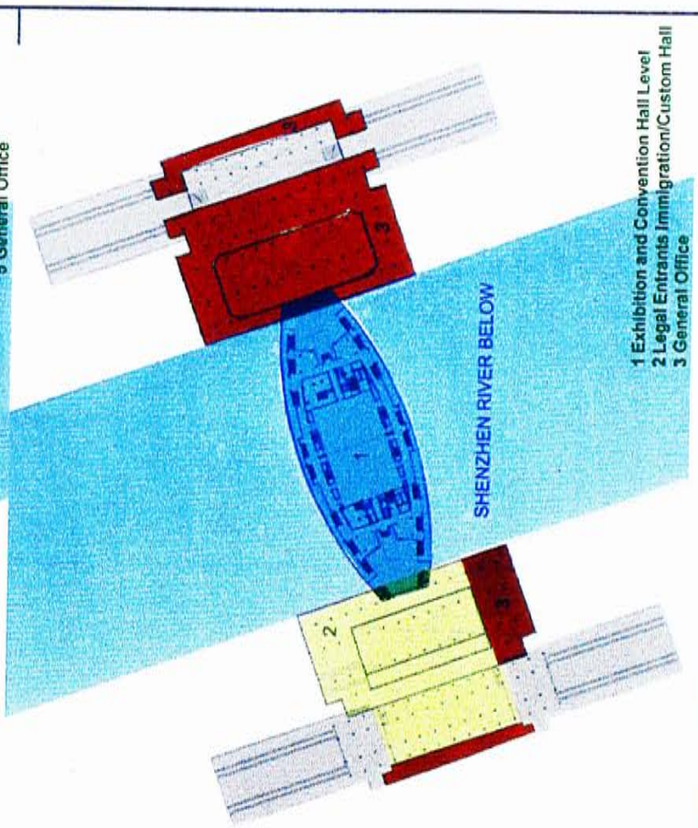
### Site Plan

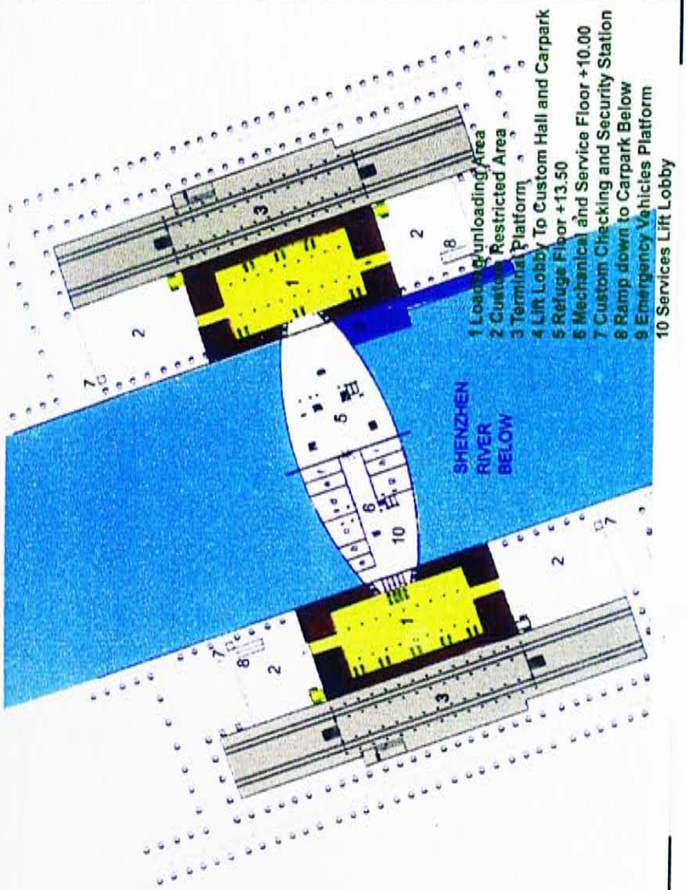


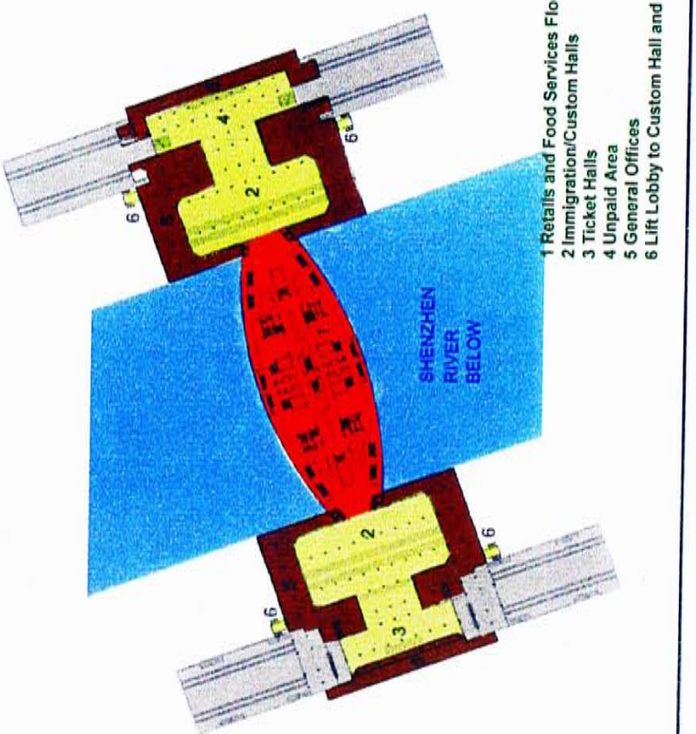
## Final Design Solutions

## Plans With Custom Halls And Railway Terminals



## Final Design Solutions

## Building Plans



**Exhibition and Convention Hall Level +26.50**

1 Exhibition and Convention Hall
2 Reception and Resting Area
3 Private Lift Lobby to Office Level
4 Mechanical Room
5 Storage
6 Legal Immigration and Custom Hall
7 Kitchen



**Shopping, Food and Custom Passage Level +[illegible]50**

1 Retails
2 Reception Counter
3 Private Lift Lobby to Office Level
4 Mechanical Room
5 Storage
6 Entrance Lobby From Shenzhen
7 Exit Lobby to Hong Kong
8 Restaurant/Fast Food Shops
9 Kitchen



**Shopping and Custom Passage Level +16.50**

1 Retails
2 Reception Counter
3 Private Lift Lobby to Office Level
4 Mechanical Room
5 Storage
6 Entrance Lobby from Hong Kong
7 Exit Lobby to Shenzhen

## Final Design Solutions

## Building Plans



**General Office and Research Team Level +46.50**

1 Reception/Resting Area
2 Private Lift Lobby to Office Level
3 Mechanical Room
4 Storage/Pantry
5 General Office
6 Research Team Office
7 Bar and Rest Area



**Video and Reference Library Level +41.50**

1 Reception/Resting Area
2 Private Lift Lobby to Office Level
3 Mechanical Room
4 Storage/Pantry
5 CD Rom Library
6 Video Tape Library
7 Reference Book Library
8 Magazine Library



**Auditorium and Meeting Rooms Level +36.50**

1 Reception and Resting Area
2 Private Lift Lobby to Office Level
3 Mechanical Room
4 Storage/Pantry
5 Auditorium
6 Meeting Rooms

**Final Design Solutions**

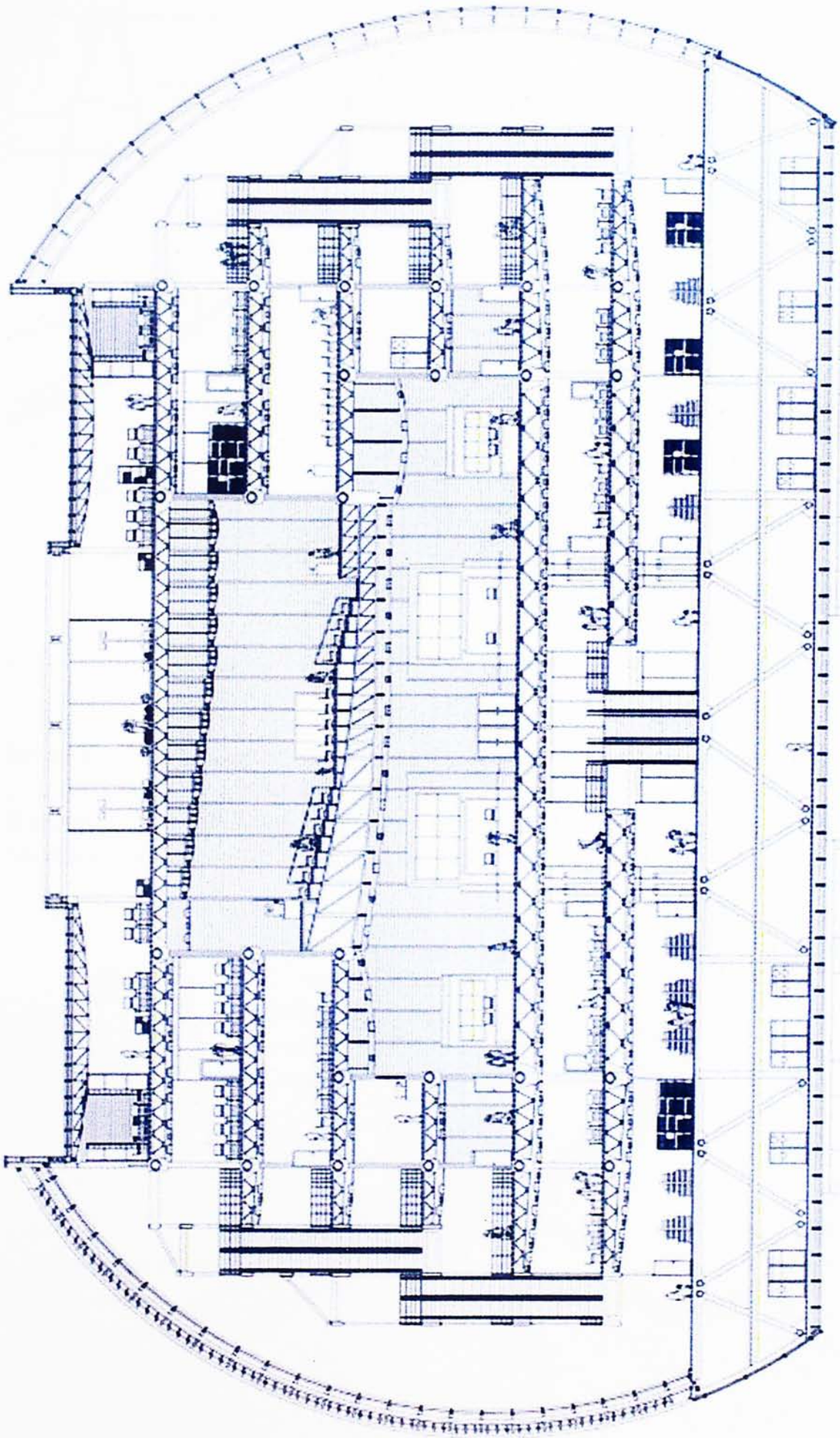
**Section And Elevation**

West Elevation

Longitudinal Section

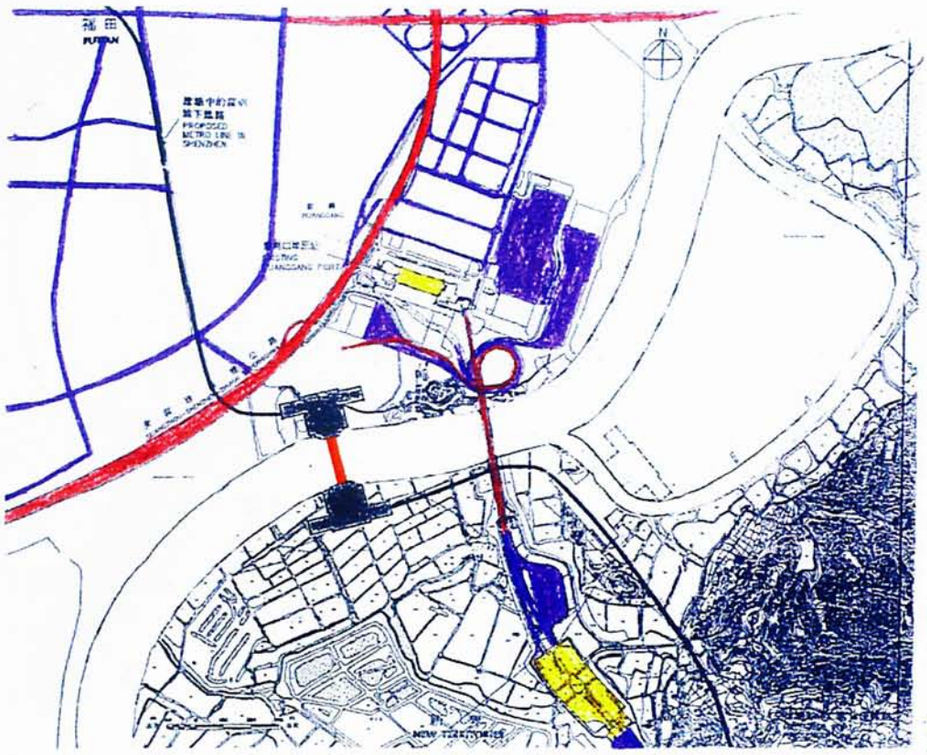
## Final Design Solutions

## Section

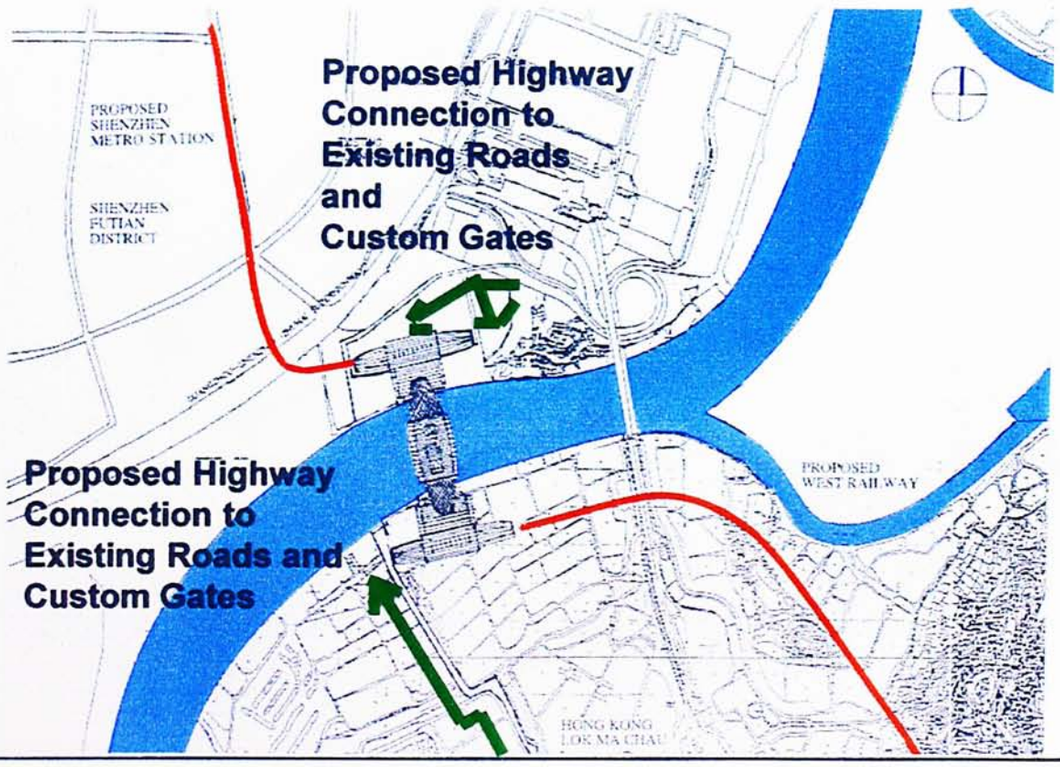


Cross Section

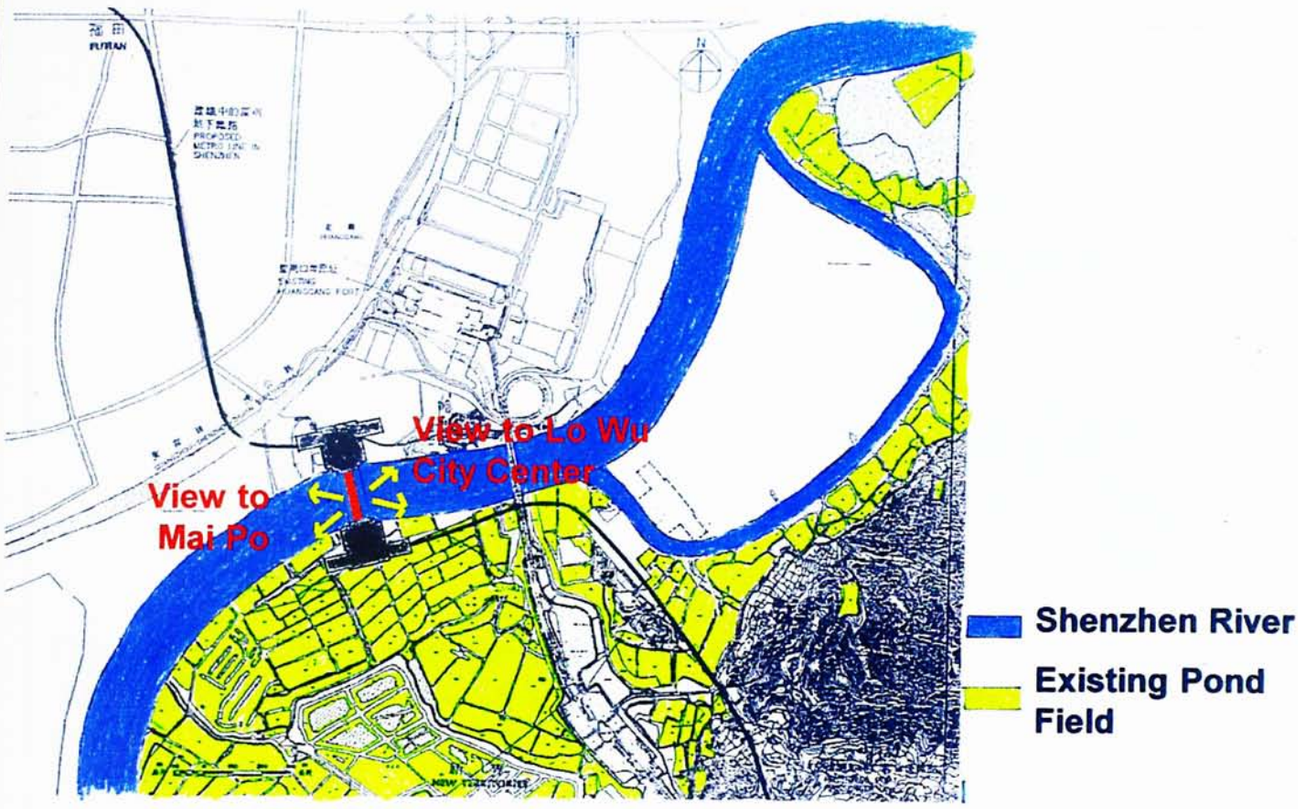
## Site And Vehicular Circulations



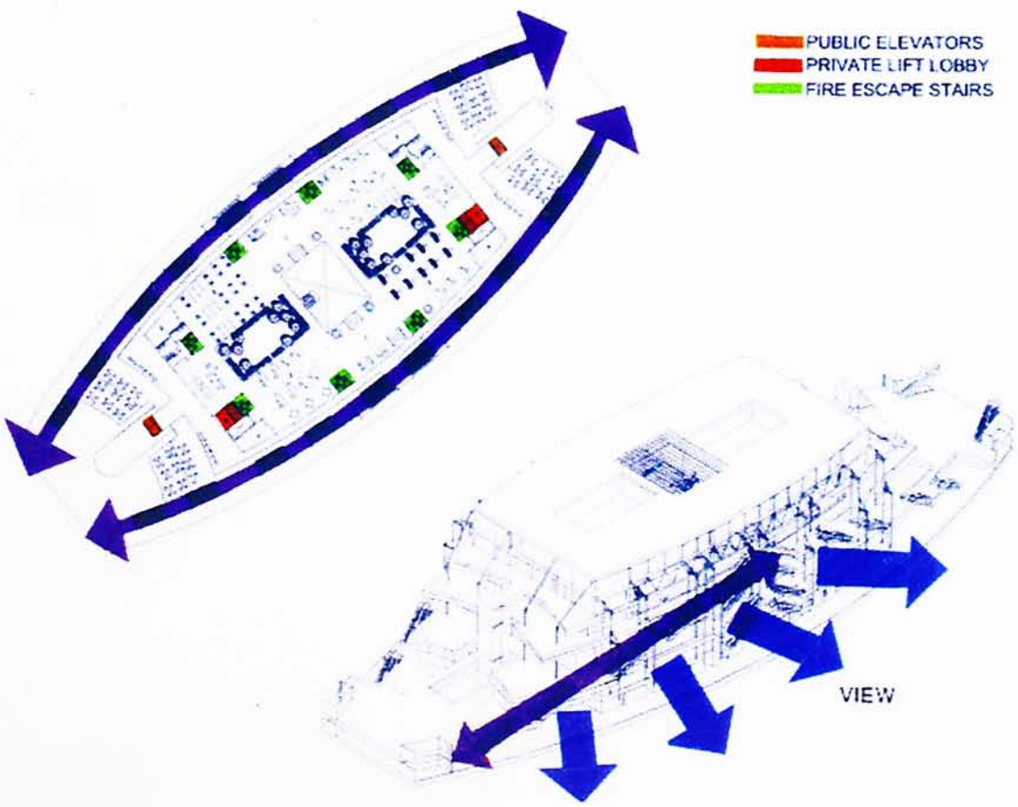

Because the proposed Congress Center is very close to theexisting highways and the custom checking gates for vehicles.
It would then have vehicular roads connected to these highway to connect to the existing roadway systems and transport necessary to the congress center.



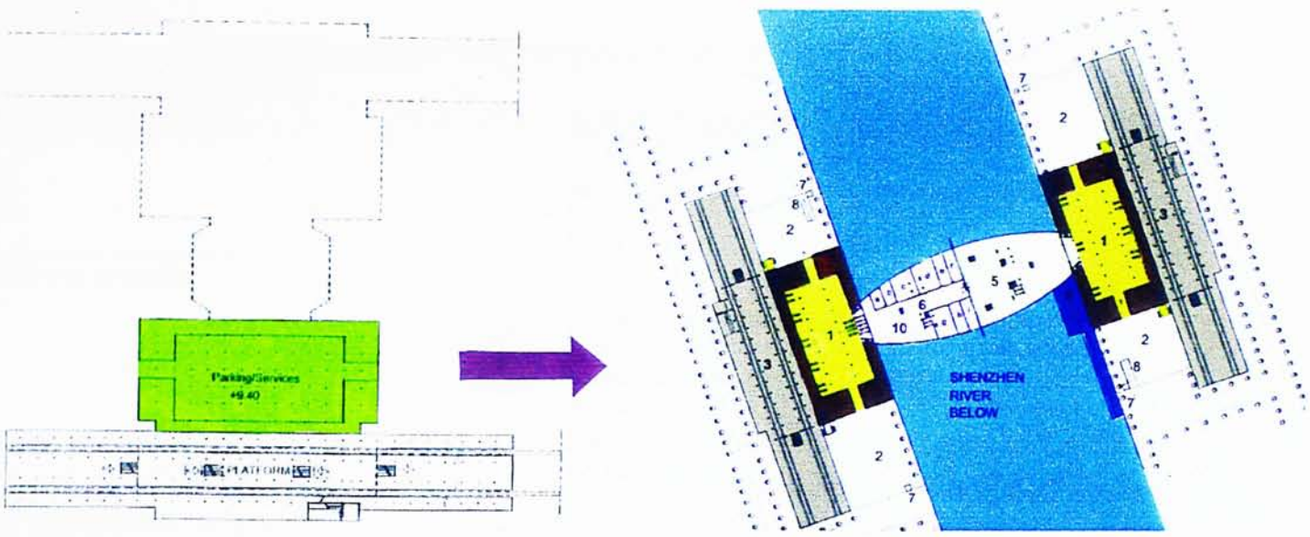
## Site And Views



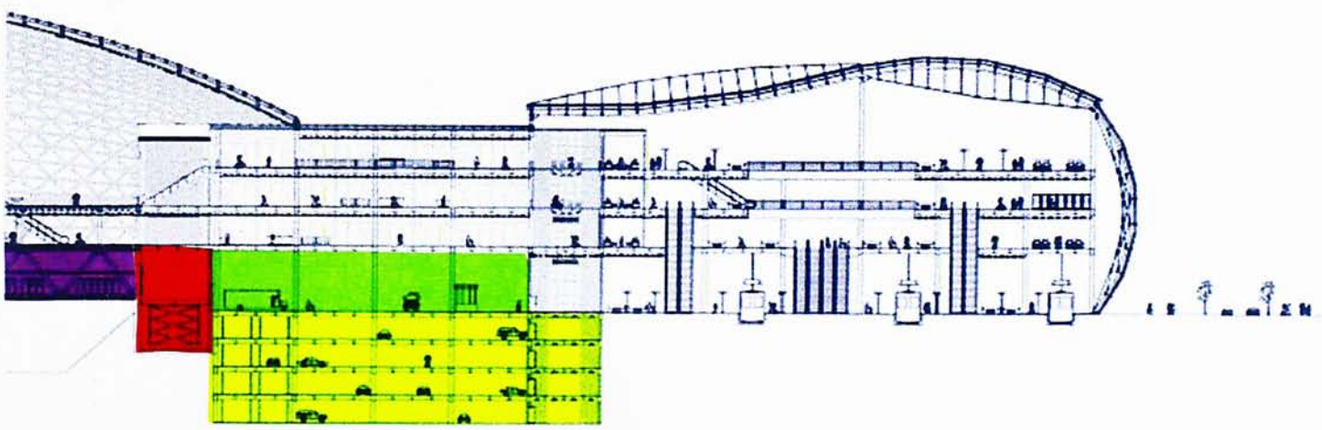

There are two important views for the congress center. One is toward the beautiful natural landscape Mai Po. The other one is viewing the LoWu City Center.
The esculators system of the congress center is then located at the two sides of elevations so that people can experience the Shenzhen River and also the beautiful views while they are going up and down to take part in the functions.



## Site, Service and Carpark

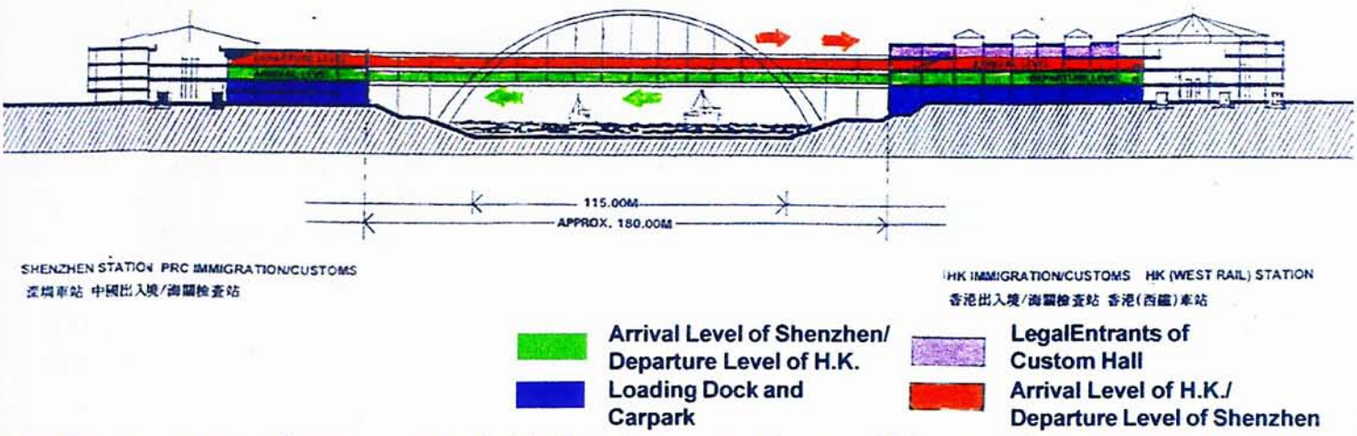



There is a carpark and service dock underneath the proposed custom hall. It could then convert this area into a loading and unloading area for the congress center.
It would have hydraulic platform to tranport the exhibits to the mechanical and services floor from the ground.
Moreover, there will be underground carpark provided for the visitors.



**Loading and Unloading Area**
**Hydraulic Platform**
**Underground Carpark**
**Mechanical and Services**

## Horizontal Circulation And Security

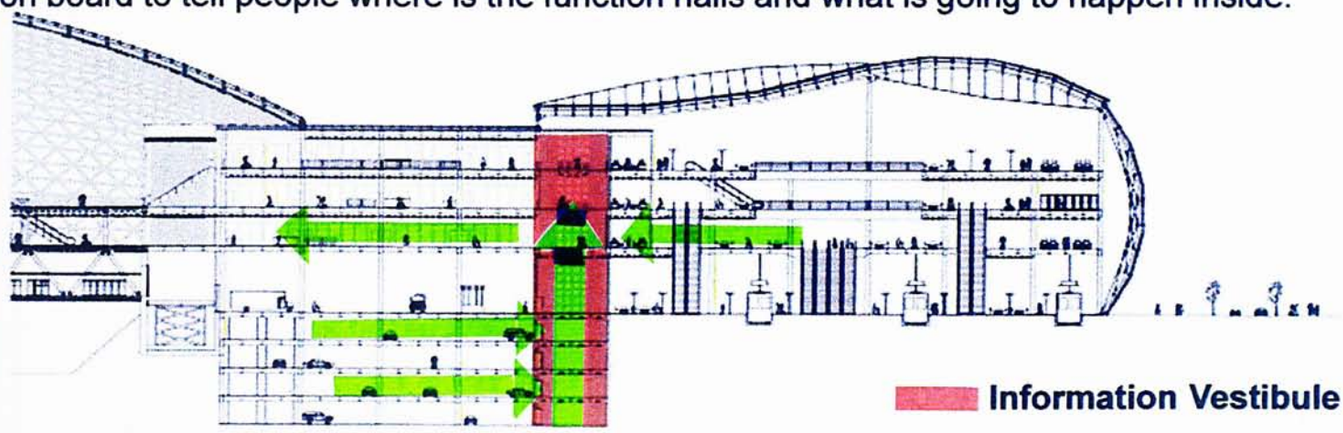


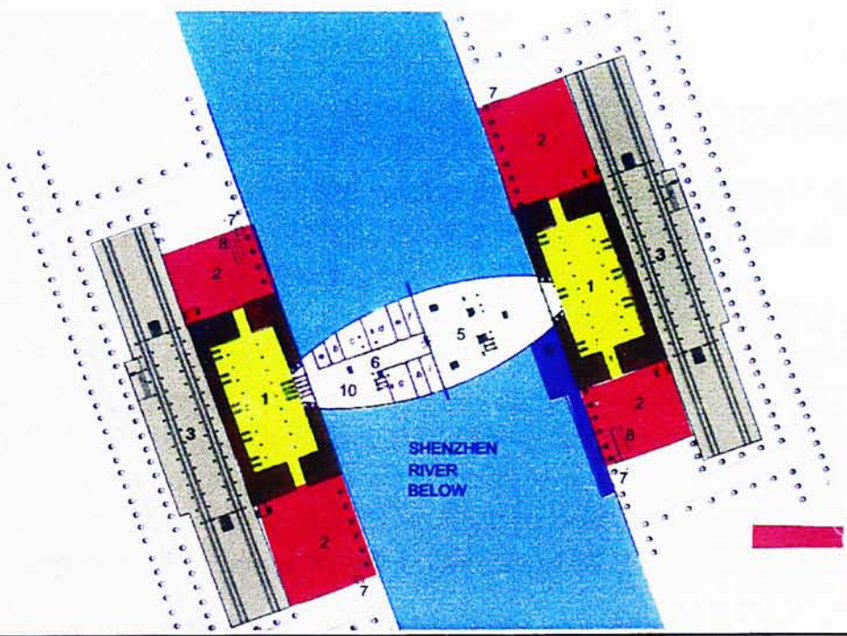

In order to ensure the security of this border area, there will be restricted area along the river banks and all the cars going in and out of these areas will be chechked by the custom gates controlled by the Custom Department.

All people come up from carparks will be forced to pass through the custom gates before entering the congress center.

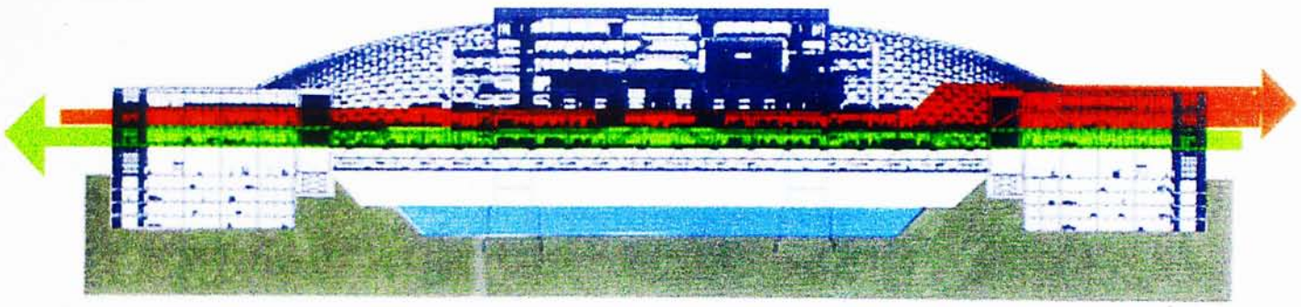
All people must be checked by custom department after leaving the congress center.

A information vestibule is located in front of the custom hall to provide a electronic information board to tell people where is the function halls and what is going to happen inside.



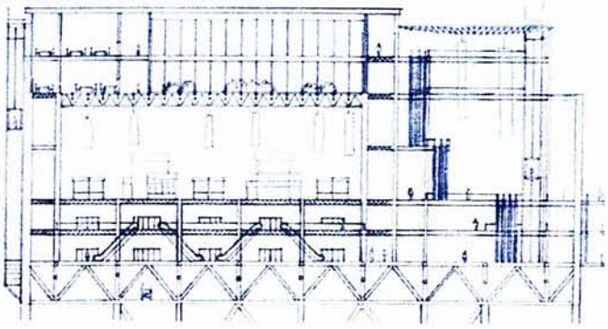
## Horizontal Circulation

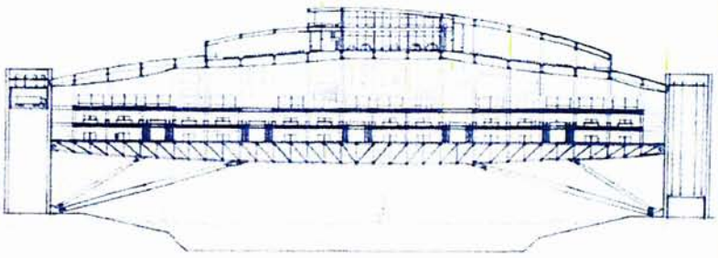


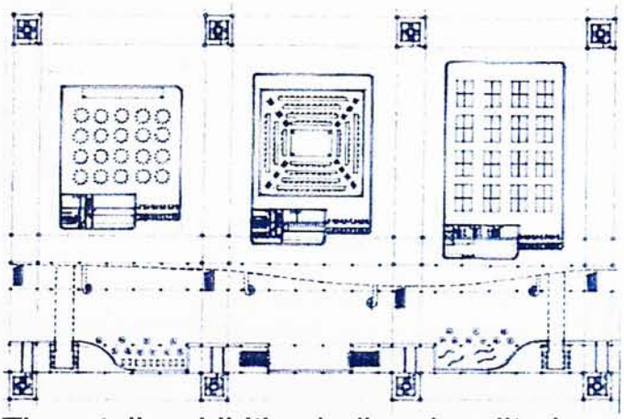
In order to respond the arrival and departure circulation system proposed by KCRC, the first 2 floors of the congress center will be used as retail and food services to cater the people passing through the congress center.
The congress center will also share the retail facilities with the cross border people.

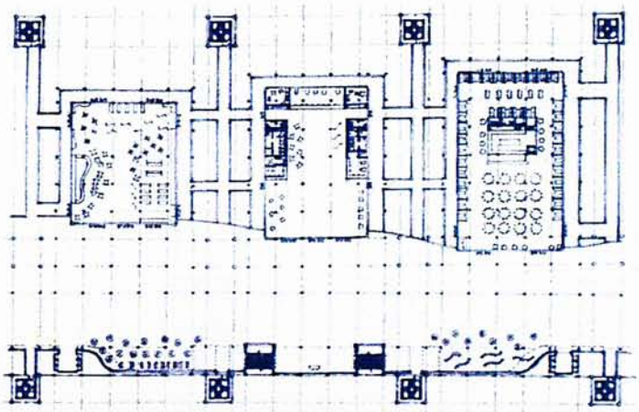
## Design Option

### Option 1





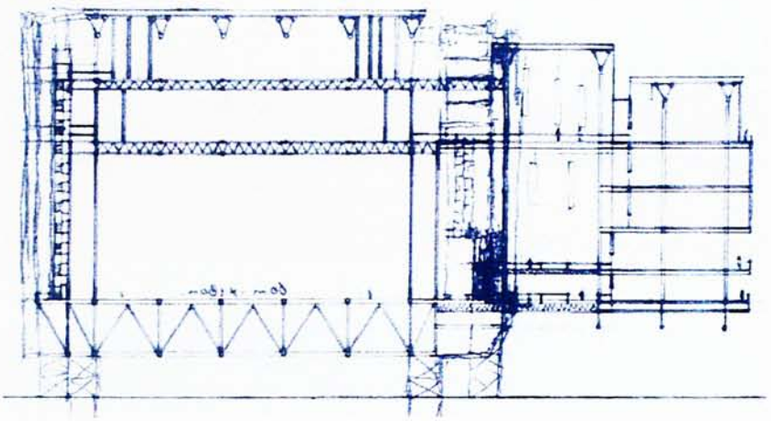




The retail, exhibition hall and auditoriums are stacked together vertically and is located at the left hand side of the building.The right hand side is left to provide 30m wide express circulation for the cross-border people.
The express circulation will be treated as entrance atrium and using the banners to attract the people below. People could see the activities happened in the atrium.
It is also nice to see the view of Lo Wu in the atrium but miss the view of Mai Po.
This is a bridge building and the prossible place to have a open area is the roof floor. Therefore, a landscape courtyard is designed at the roof floor of office. The courtyard could help to make the office floor to become more human.
However, the atmosphere of atrium is too cold and people will miss the shops easily.

## Design Option

**Option 2**



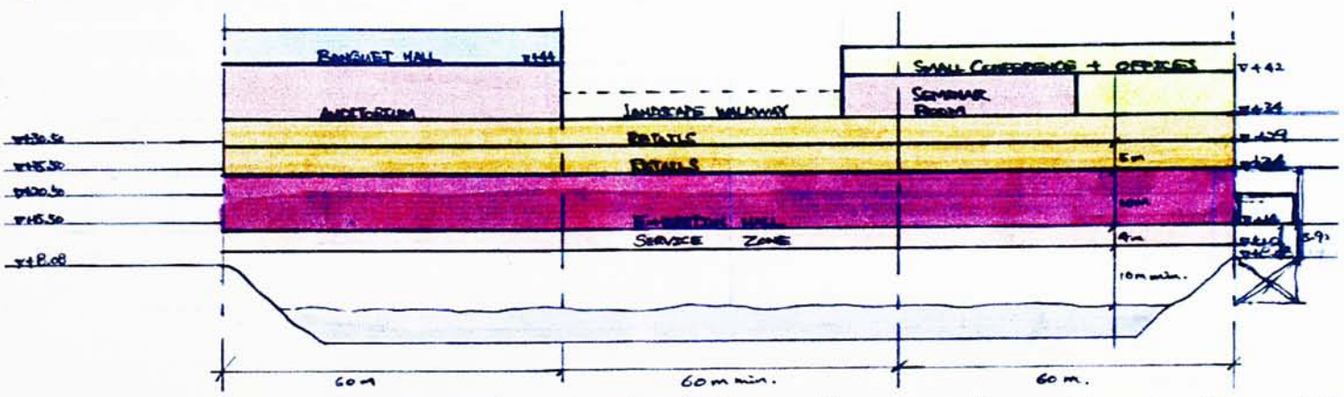
**Exhibition Hall Auditorium** **Major Circulation** **Office Retails**

The cirulation is located in the central area and the large exhibition and auditoriums are stacked vertically at the left hand side. The offices and retails are at the right hand side.
It would easier to design the structure of exhibition hall.
There are activities happened along 2 sides of the major circulation and make the environment lifely.
Office and library can have view to the river.
However, the circulation would have less view to the outside.
The building may be too wide to loss the form of bridge.

**In conclusion, it is better to stack all the functions vertically. There should be views to the outside to see the river at two sides of the building.**

## Zoning Design Option

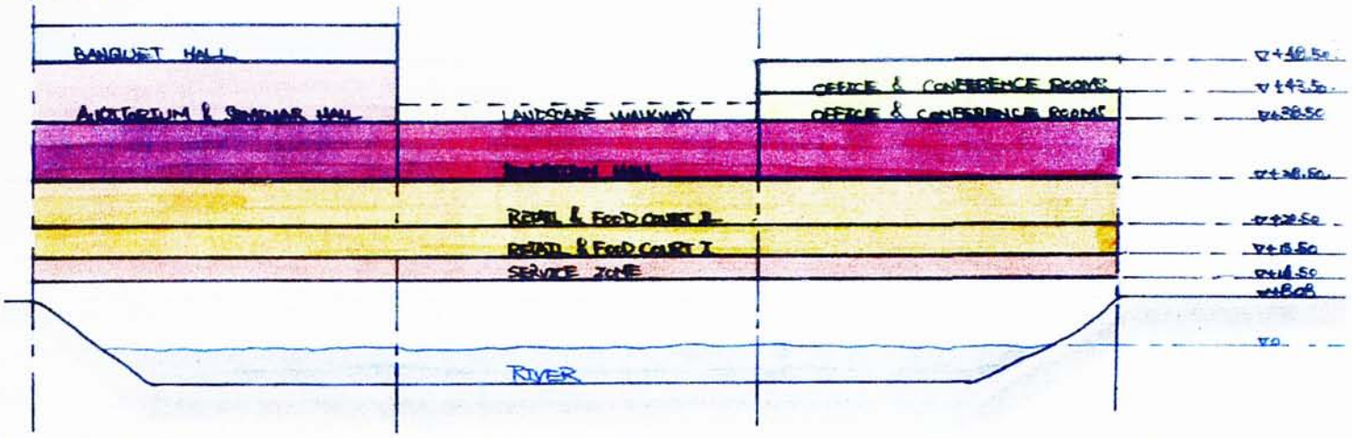
**Option 1**




The exhibition hall is located below the retail floors. However, it would make the retail levels to become +24.0 and+29.0 respectively. It will then affect the circulation design of the custom hall and railway station too much.

## Zoning Design Option

### Option 2

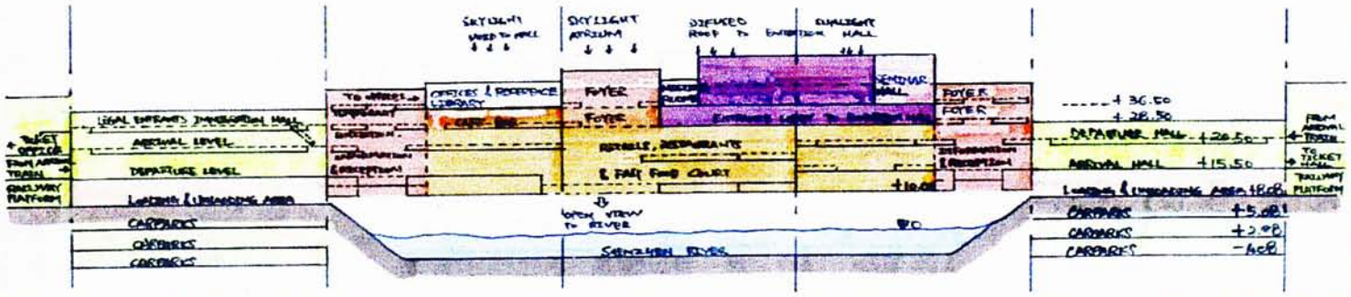



The exhibition hall id at on top of the retail floors and could retain the levels of the retails to be +14.0 and +19.0 respectively. It could minimize the circulation system of the custom hall.

**In conclusion, the exhibition hall and other functions should be located on top of the retail floors to minimize the impact on the circulation design of the custom halls and the railway stations.**

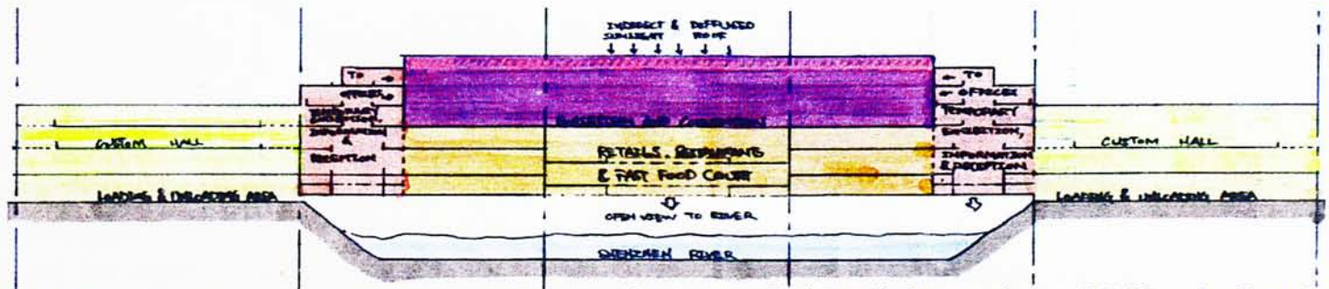
## Vertical Zoning Design Option

### Option 1




Exhibition Hall and Auditorium is located at right hand side and the office part is at the left hand side.
It could have natural sunlight to light up the central area and the entrance atrium of the floors below.
The travel distance to the function halls is unequal for people from both sides.

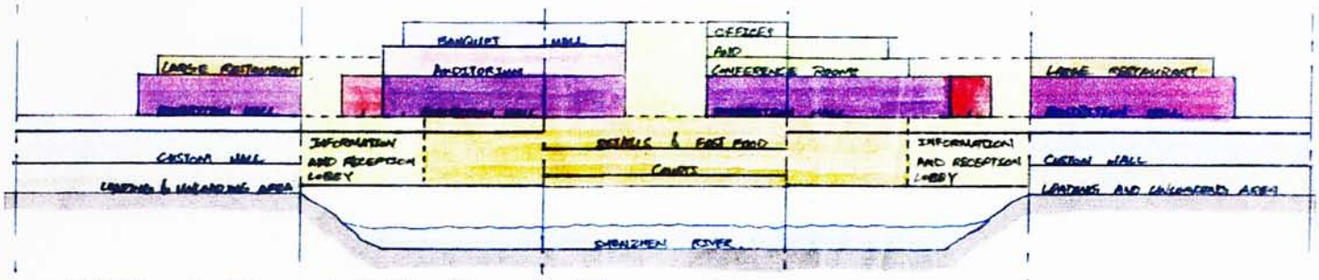
### Option 2




Exhibition hall is located at the center and have sunlight to light up the exhibition hall at the roof. Natural sunlight can also go into theentrance atrium. People from both sides can have equal travel distance to the function hall.
However, the exhibition hall is too large for information based products.

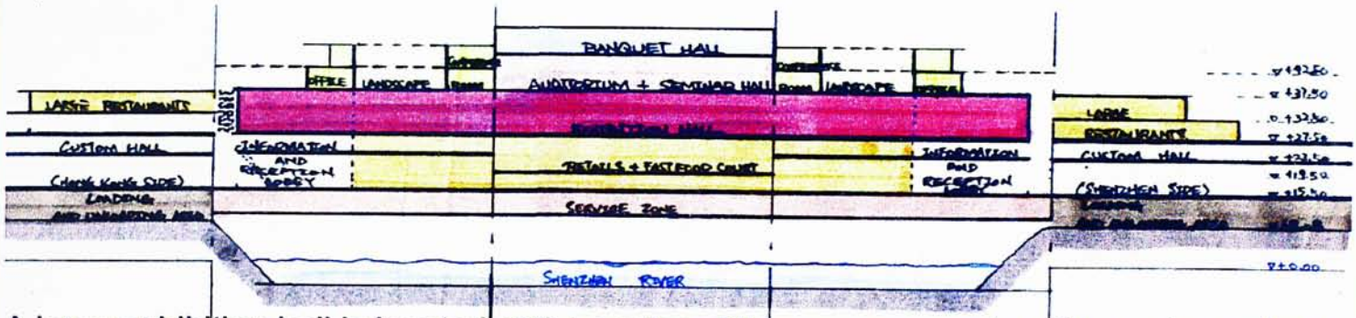
## Vertical Zoning Design Option

### Option 3



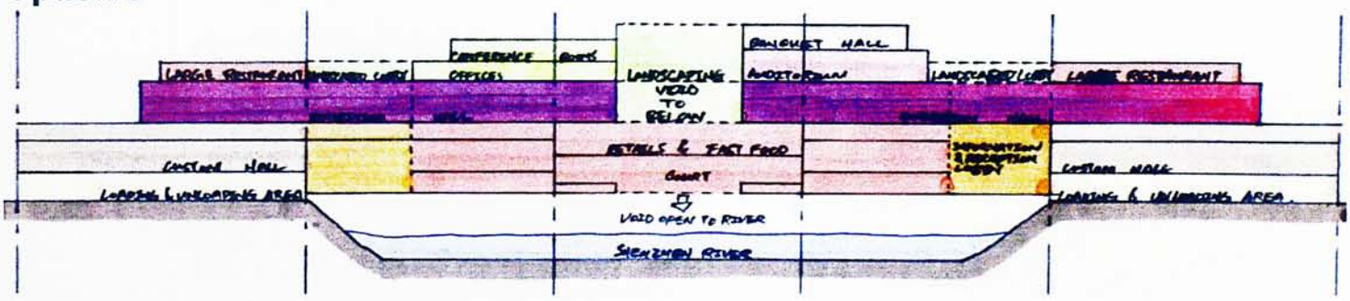

The exhibition hall is subdivided into 4 different size ones. Two of them are located at the roof of the custom halls.
There is natural sunlight go into the central area of the retail floors below.
The travel distance to the function halls for both sides of people is unequal.
Too little sunlight in the entrance atrium.
The circulation design involved the custom halls is too complicated.

### Option 4




A large exhibition hall is located at the center of thecongress center. Two restaurants are located at the roof of the custom halls.
There are landscape courtyard at the roof to humanize the office floor.
The exhibition hall is too large.
There is too little sunlight in the entrance atrium.
The circulation design involved custom halls is too complicated.

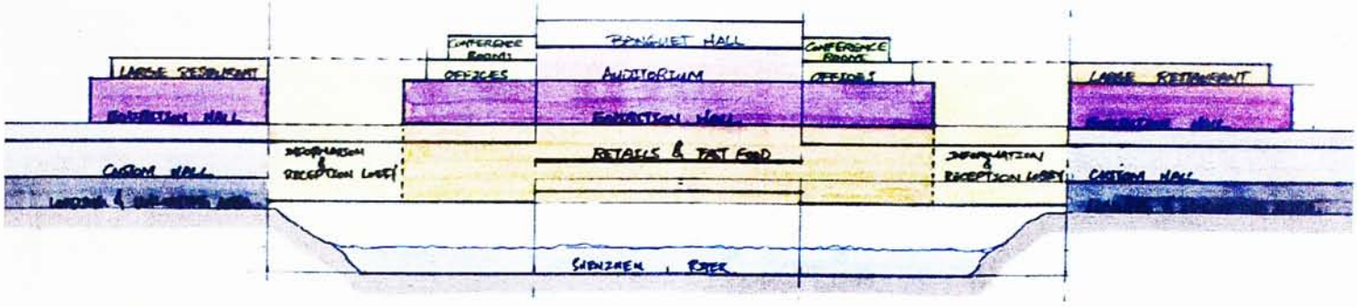
### Option 5




The exhibition is subdivided into two medium size halls. Part of them is overlapped the roof of the custom halls.
Landscaped courtyard is on top of the roof to humanize the office floor.
Natural sunlight could penetrate into the central atrium of the retail floors below.
The exhibition halls area is too large.
There is no natural sunlight go into the entrance atrium.
Circulation involved the custom halls is too complicated.

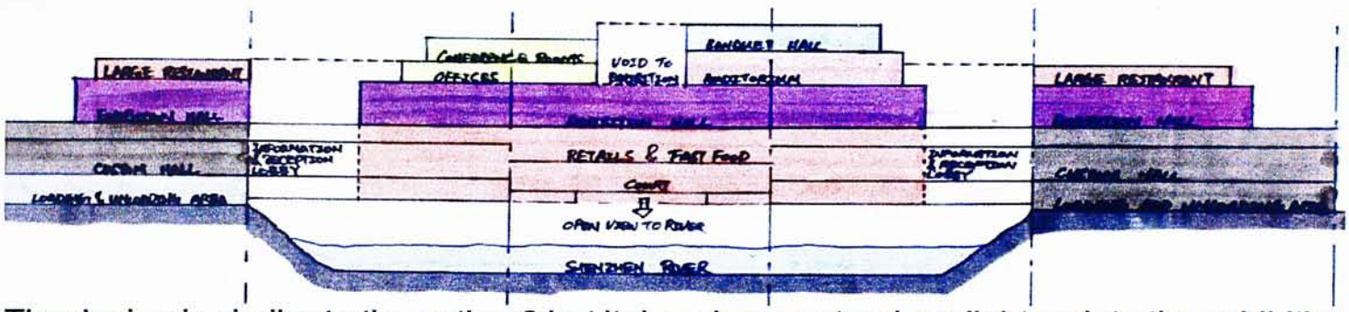
## Vertical Zoning Design Option

### Option 6




The exhibition hall is subdivided into 3 halls and 2 of them are at the roof of the custom halls.
There is enough sunlight go into the entrance atriums.
The travel distance for both sides of people to go to the function halls is unequal especially to the halls at 2 ends.
The circulation involved the custom halls is too complicated.

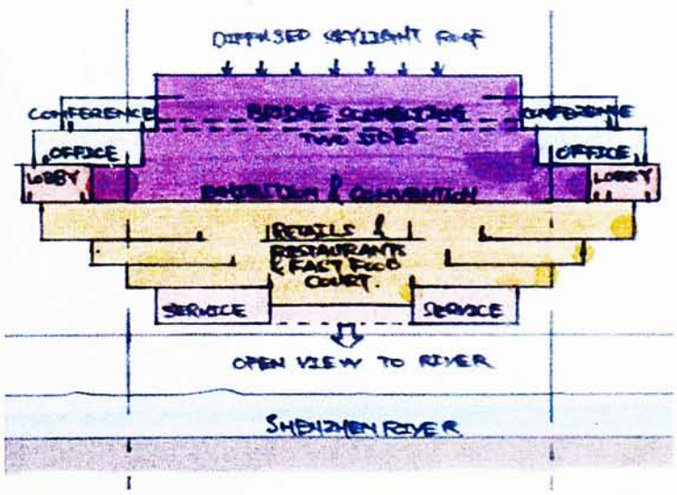
### Option 7



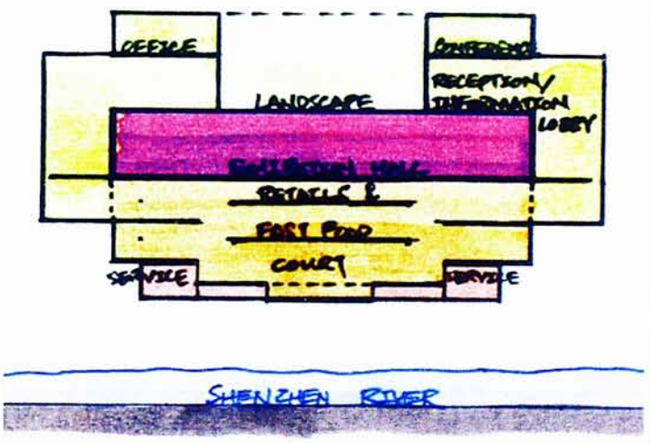

The design is similar to the option 6 but it does have natural sunlight go into the exhibition hall by open up the roof of the exhibition hall.

## Cross Section Zoning Design Option

### Option 1



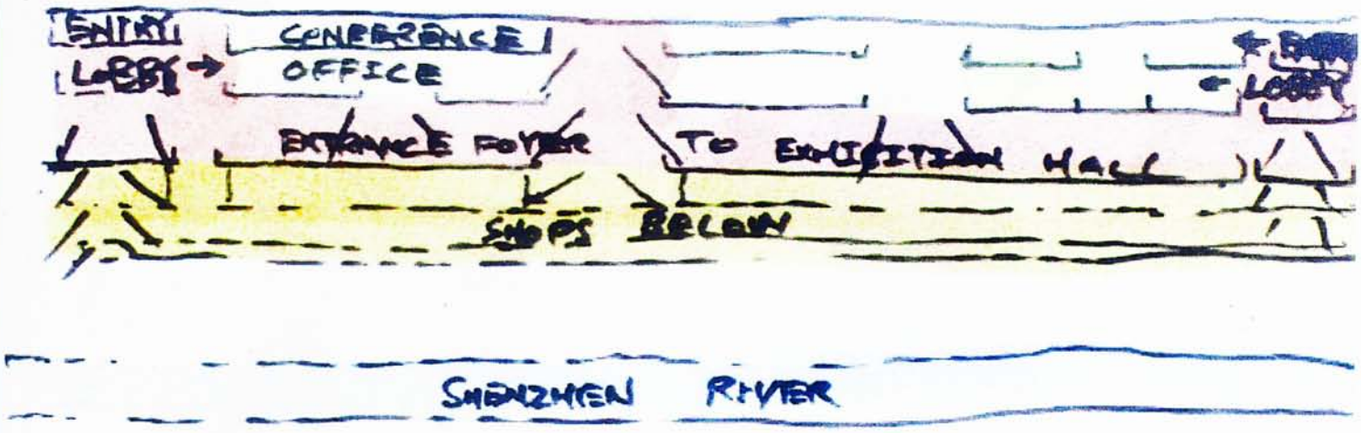

### Option 2




The cross section could have stepping effects in form in stead of a rigid retangular box.
The two sides of elevations could become the entrance atriums of the function halls so that people could have views while they are going up and down the congress center.

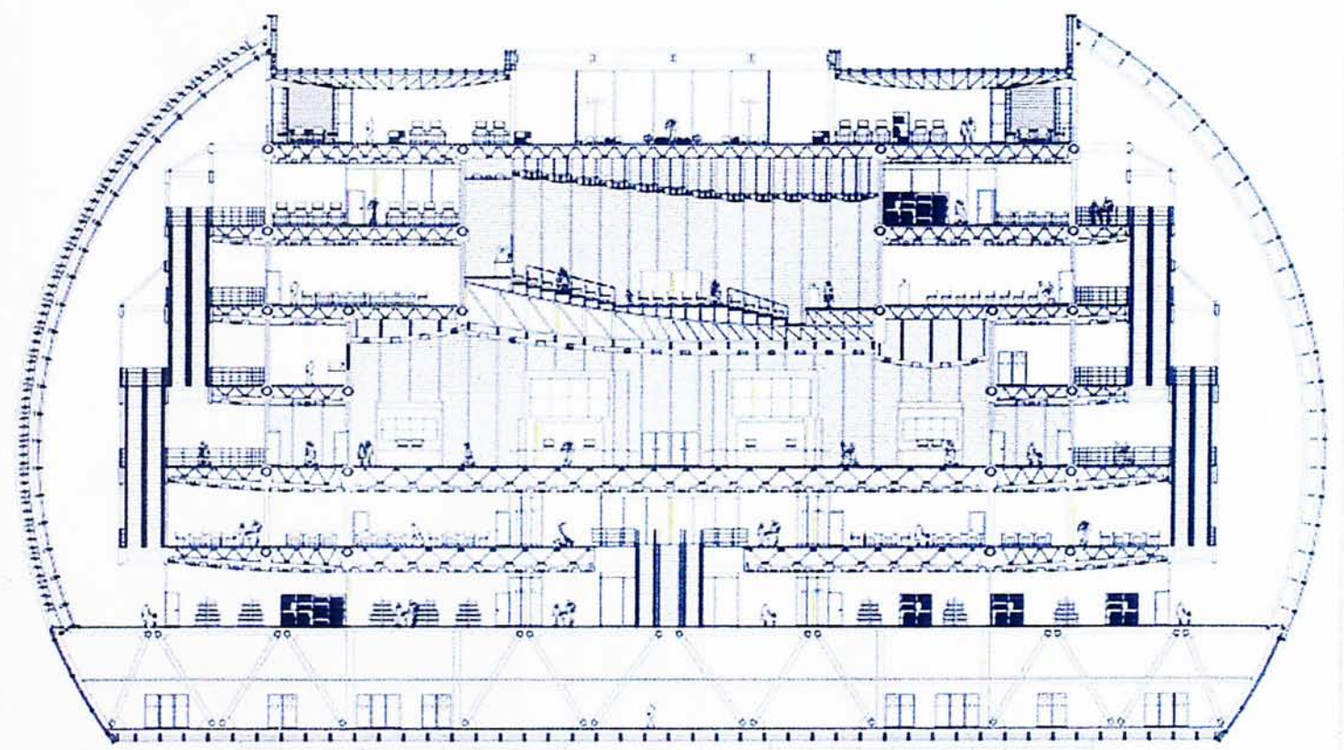
## Cross Section Zoning Design Option

**Option 3**

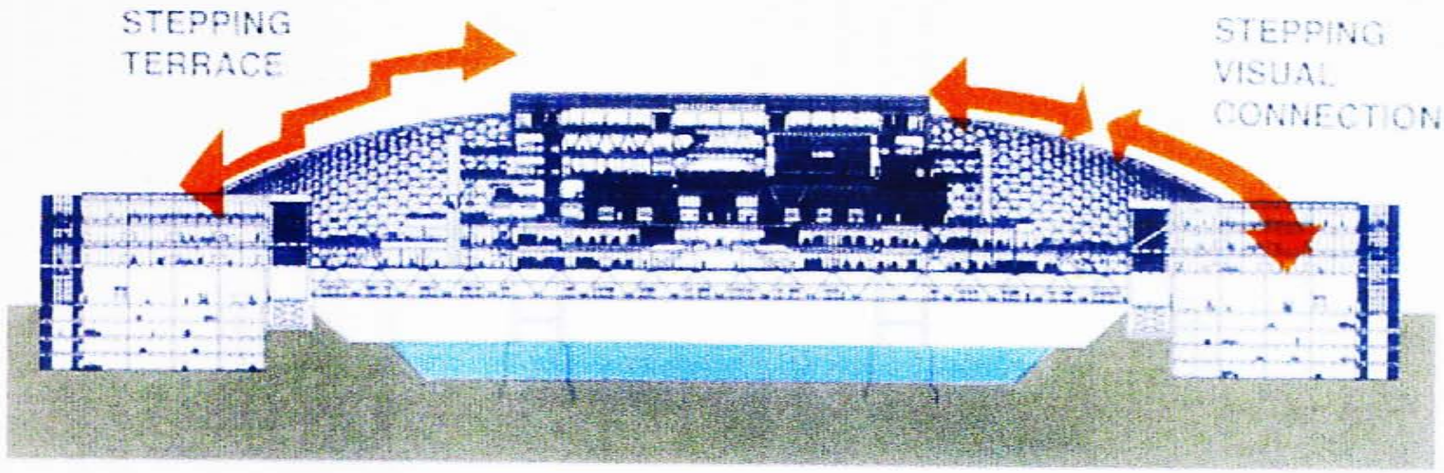



Part of the office floor could be opened up for natural sunlight penetration.
Void openings could have visual connection between floors.

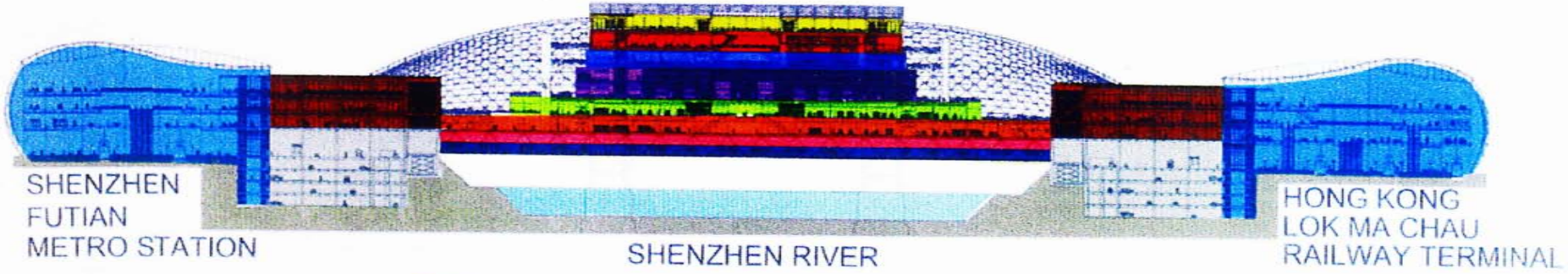
## Final Zoning Design



**The sides of elevations are used as entrance atriums of the function halls. People could see the activities happened in the atriums and also enjoy the veiws to Lo Wu or Mai Po.**
**Roof Landscaped Courtyard is used to define the office floor and make it become more human.**

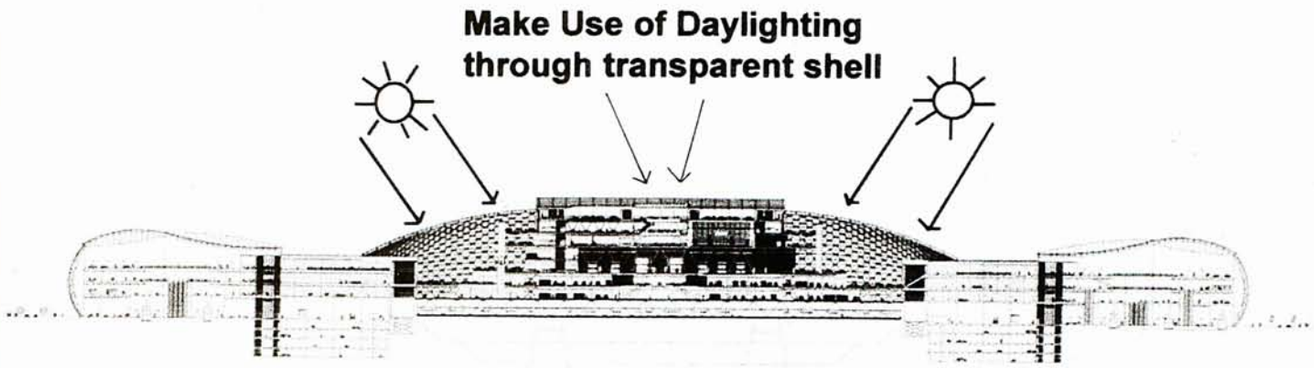



**The stepping terraces would have stepping visual connection through the atrium and people can sit at there to see the activities happened in the congress center.**
**People from both sides have equal travel distance to thefunction halls.**
**Natural sunlight could light up the entrance hall of the auditoriums.**

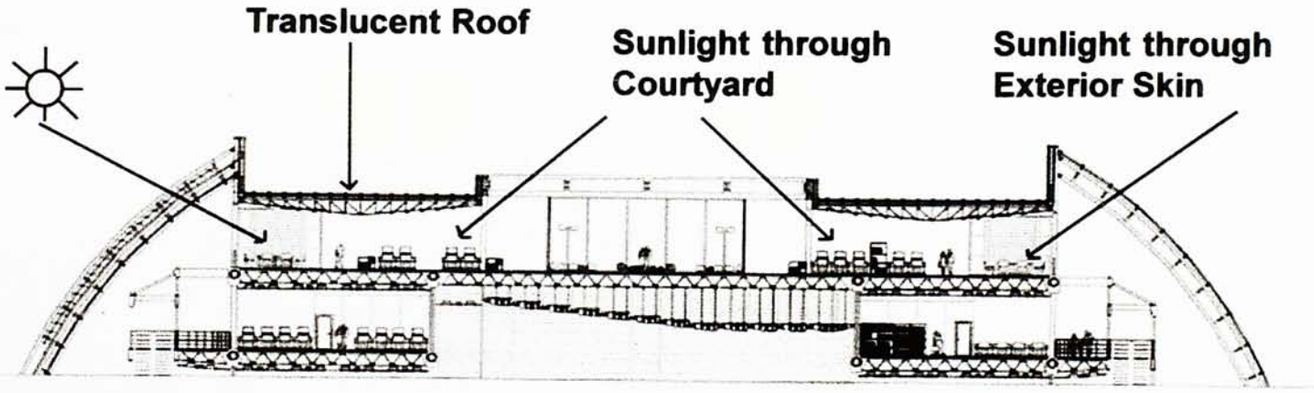



- Retail and Food Services Floor
- Exhibition and Convention Floor
- Auditorium and Meeting Rooms Floor
- Video and Reference Library Floor
- General Office and research Teams Floor
- Railway Terminals
- Immigration/Custom Halls
- Loading/Unloading Area
- Mechanical Floor
- Refuge Floor
- Retail Floor

## Lighting, Daylighting and Shading



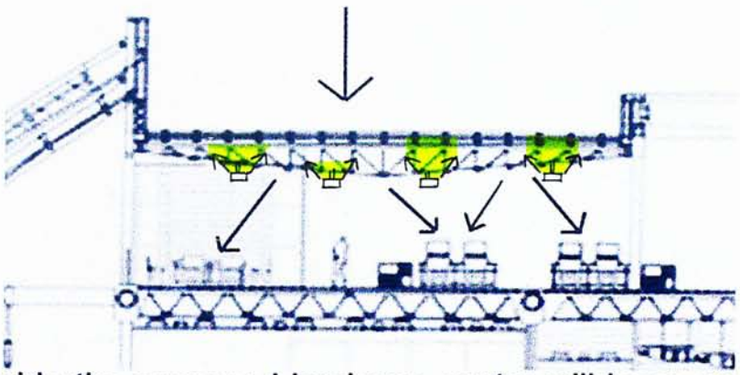

The proposed congress center will encourage using daylight.
Therefore, the enclosure of the building is trying to make it very transparent.
Especailly at the two ends of the building as it is the entrance atrium.
Such daylighting will enchance the welcoming atmosphere.
This also reduces the energy uses in the artifical lighting.




However, as the top floor is used by the general offices and research teams offices, the transparent roof will overheat the top floor space and at the same time creates too much glare for the office working environment.
Therefore, the office will be enclosed by the translucent roof to shield the sun instead of using transparent roof.
Nevertheless, the top floor is basically a large space with deep plan arrangemnet, the inside area will have less daylighting from thr window at two ends.
Hence, there are two landscaping courtyards to be located along the central axis so that the inner areas of the office spaces could borrow natural lighting into the working environment.

## Lighting, Daylight and Shading

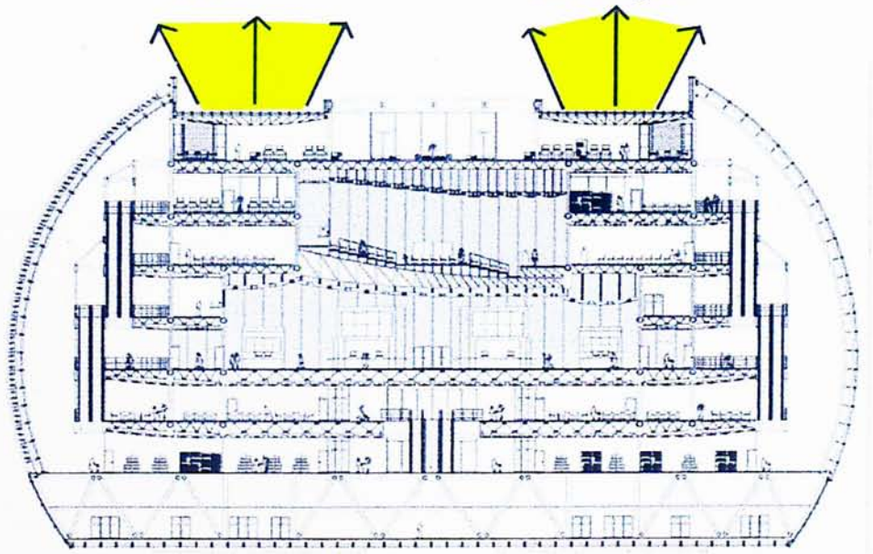
**Reflected Light by Translucent Glass onto the Office Desks**



Most of the spaces inside the proposed business center will have ambient lighting provided by either spot lights or flourescent lights.
However, there is special arrangement on the top floor of the office spaces.
The roof of the office spaces will be using translucent glasses and there are some spot lights to light up the translucent glasses. Those translucent glasses will reflect the sport light onto the working deskes of the offices. Such kind of lighting will difuse the spot light and make the lighting effect to become more evenly distributed for a more comfortable working environment.

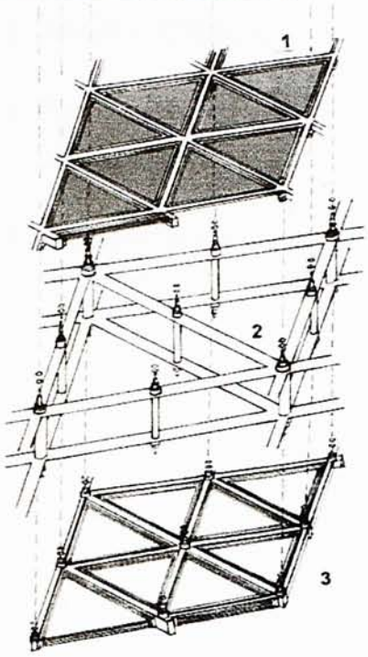
**Illuminated Translucent Roof**

**A Lantern Effect in the Night**



moreover, the lighting up translucent glass roof will become special lighting effect for the special character of the building as it will become an illuminated lantern in the night time.

## Lighting, Daylight and Shading




**1 Perforated Metal**

**2 Structural Frame for the Shell**

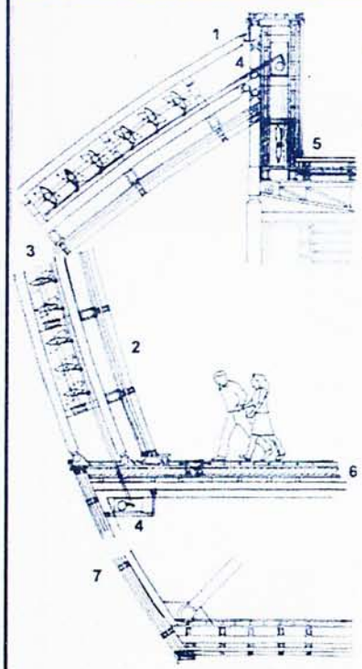
**3 Double Glasses Window Enclousure**

Obviously, it needs shading devices to shade the building as the proposed business center is too transparent on the elevations.

Therefore, it will have perforated metal on the layer of the shell to act as shading device to the the atrium at two ends. The perforated metal sheet is attached at the outside instead of inside as we want the sunlight level to be reduced before it is entering into the inside of the building. Such kind if arrangement is more efficent than putting the shading device behind the enclousure of the glasses as the sunlight is already enter the space in the second case.

Moreover, in order to further reduce the temperature of the atrium, there are double glasses layer to attach on the lower layer of the shell at two ends. The air in between the glasses will act as insulation to isolate reduce the temperature of the inside environment.

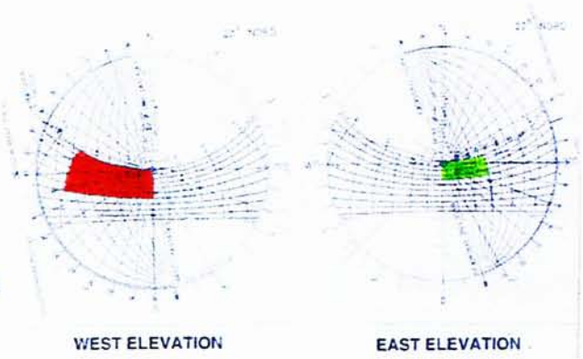
## Lighting, Daylight and Shading



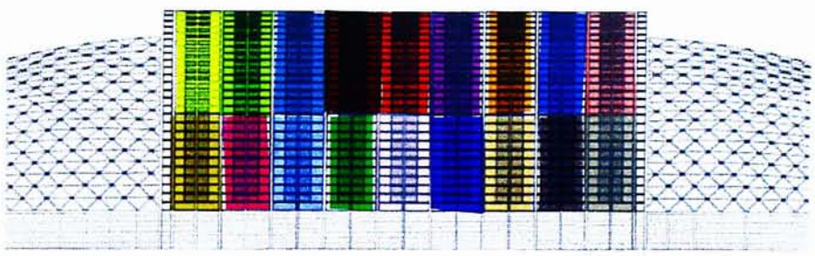

**2 Double Glasses**

**3 Perforated Metal Louvers**

**4 Computerized Louvers Controllers**

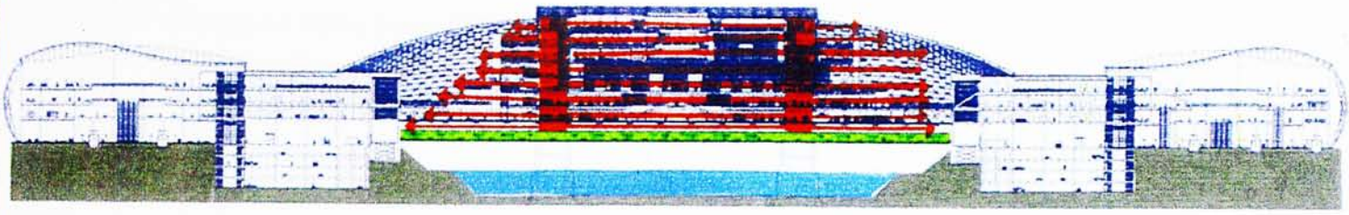


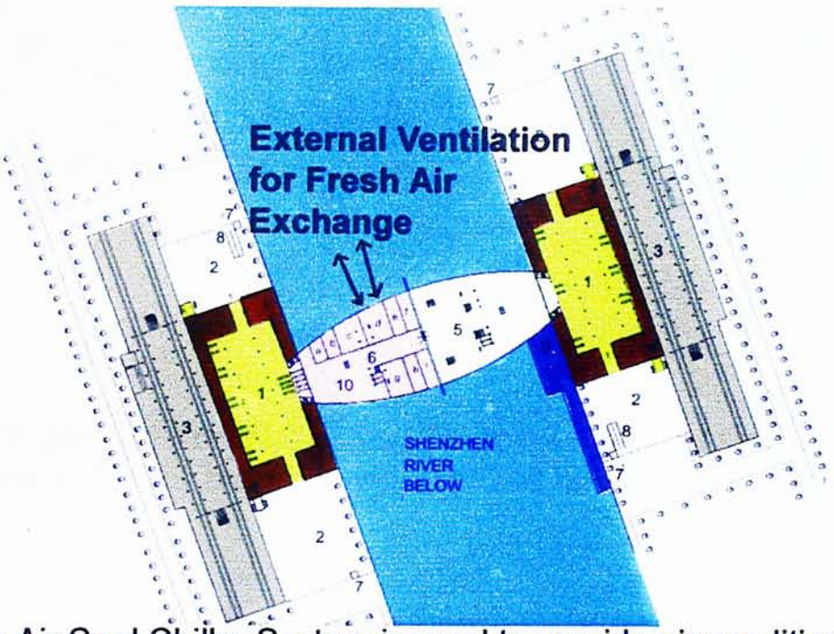
WEST ELEVATION EAST ELEVATION



As there are two elevations facing to east and west, it also needs to shade the sun according to the time and sun angles.
It is considered that west sun is more critical than the east one as the east sun is in the morning time and the temperture inside the space is not too high for people to with stand as the sun is gradually to increase the room temperature with acceptable level.
Therefore, the east elevation will not have external louvers to shade the sun.
However, there will be external louvers made by perforated metal sheet to shade the sun.
It is a rotable system controlled by a computerized louver controllers at the top and the bottom of the louver system.
The louver system is subdivided into 18 zones and each zone will be rotated to shade the sun according to the sun angles and the degree of the temperture.
It is because the west elevation is a double curve plane and hence, each zone will face the sun at different angles. The angle to be rotated is then different at different zones.
Both east and west elevations will use double glasses system to work as insulation system to reduce the temperature inside.

## Natural Ventilation and HVAC





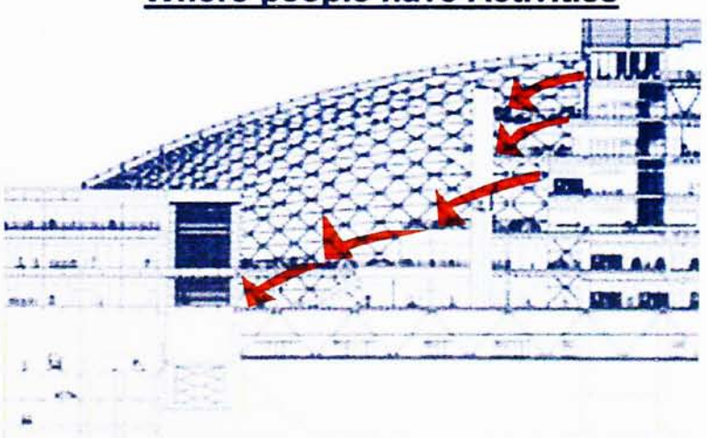

**Mechanical Floor**

**Services Core**

**(d) Chiller Room**

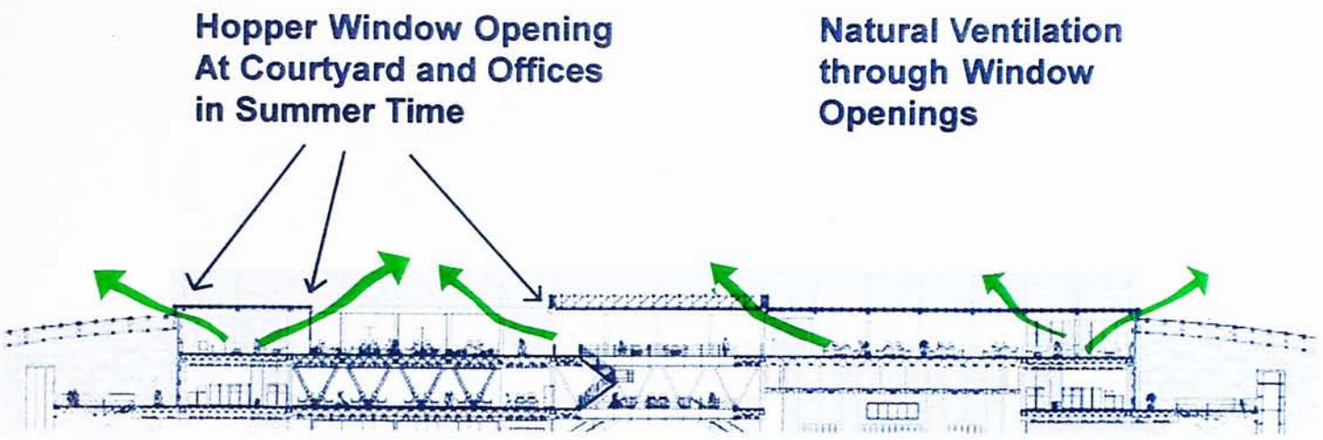
The Air Cool Chiller System is used to provide air conditioned environment.
The chiller machine is housed in the mechanical rooms in the mechanical floor.
It would have external ventilation to pull the fresh air in for the air exchange in the chiller room. There will be louvers to cover the elevation of the chiller room for the air exchane opening.
The cooled air will pass through the service cores and will be distributed to each rooms by the Air Handling Units in each floors. There are two A.H.U. at two ends of the service core every floor.

**Cool Area only Cover**
**Where people have Activities**



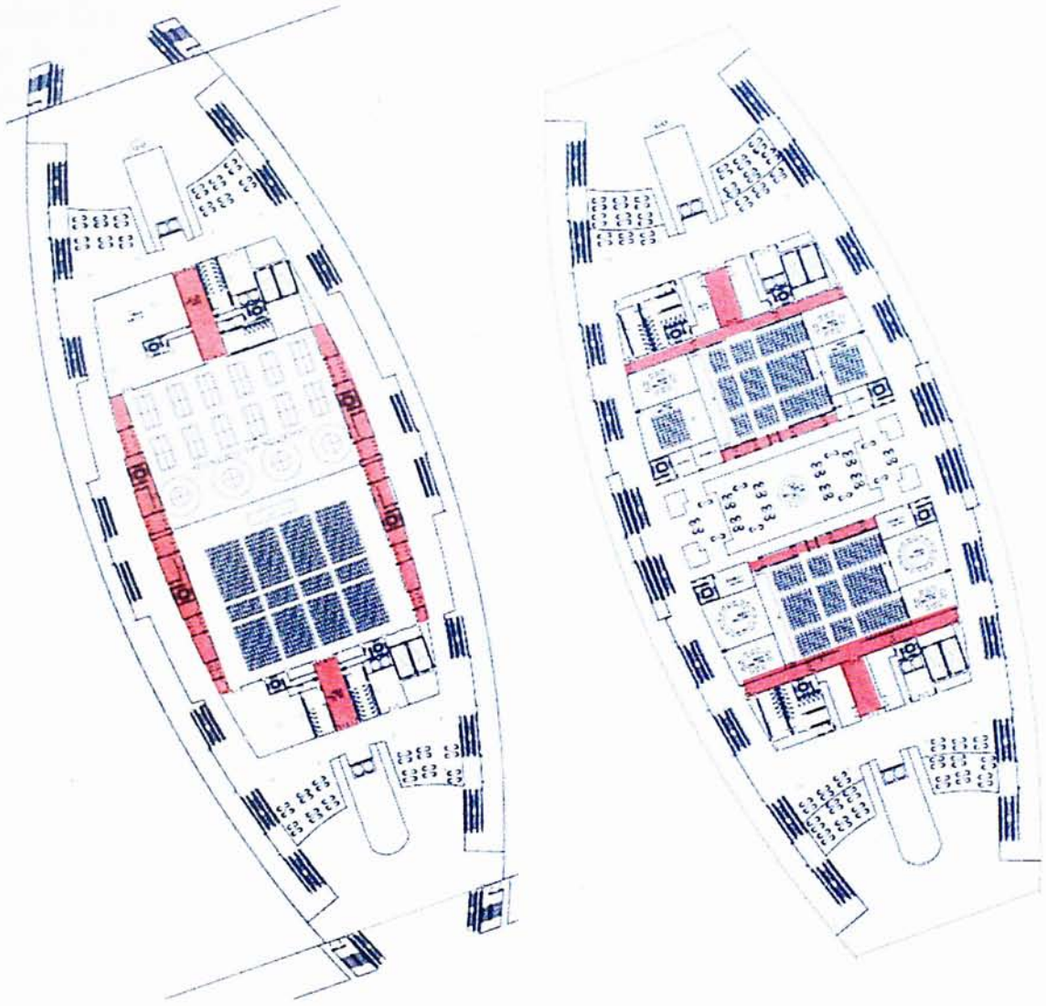
Cool Air would only supply to the areas where people would reach.
There will be mechancal fans at roof to extract he hot air at the roof so that air circulation would be enhanced to make sure the cool air circulation is working effectively.

## Natural Ventilation and HVAC




The top parts of the windows at the courtyards and the roof could be opend as hopper windows in the hot days to encourage the natural ventilation at the office floor.

## Acoustics



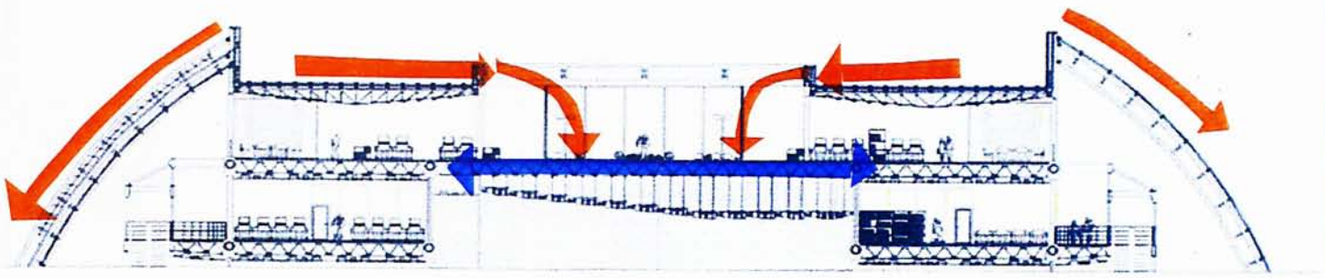
**Double Layers of Solid to Isolates Sound From Outside**

The auditoriums and the exhibition and convention hall are considered to be noise sensitive rooms.
Therefore, there are double layers of walls and acoustics doors used to enclosed the auditoriums and convention hall.

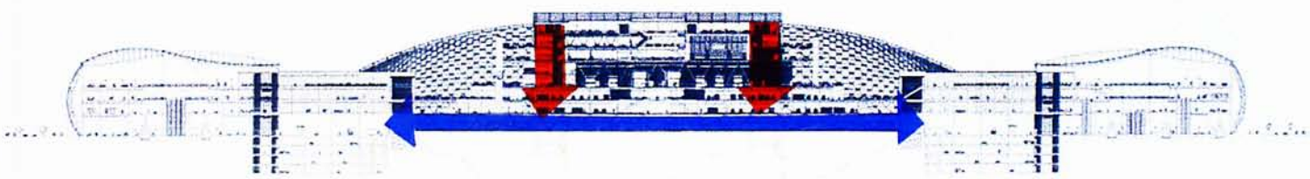
## Plumbing and Drainage

**Water Drained out by Curved Skin**

**Water is Directed into Courtyard and Drained out by Drainage system in Courtyard**



The rain water will be drained away by the curved external walls.
The water at the roof of the office floor will be directed to the courtyards and then drained away through the drainage system in the courtyards.
The water will then be drained out of the building through the drainage treatment at the mechanical floor.

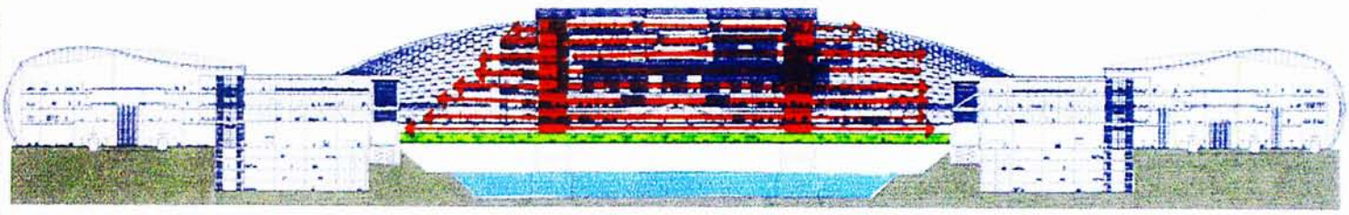


**Drainage through Service Cores**

**Mechanical Floor**

The drainage and plumbing system will be connected to the mechanical floor through the service cores.

## Power

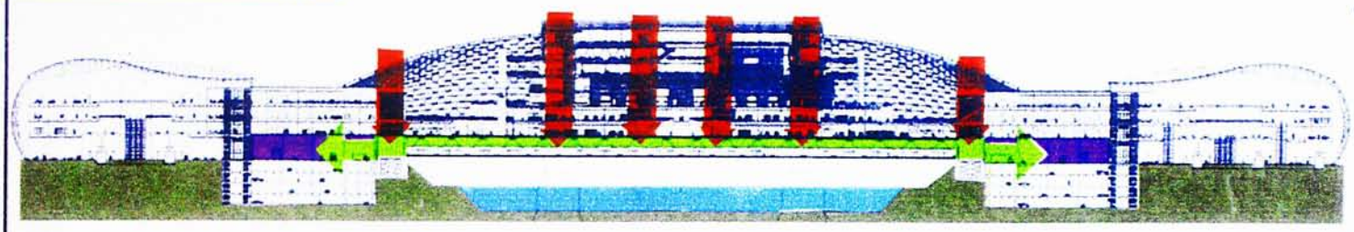


Mechanical Floor

Services Core

All the main switch room, emergency generator and electricity supply will be housed in the mechanical floor.
The electricity will be supplied to each floor through the service cores.
It is a separate systems from the custom halls and railway stations as it is considered to be a separate individual building from the others. Therefore, there is no provision from the railway stations.

## Means of Escape



Fire Escape Stairs

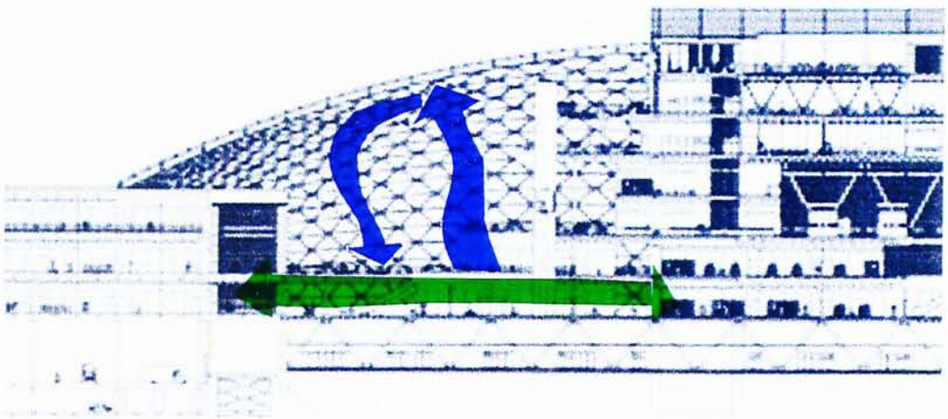
4 Hours F.R.P. Refuge Floor

Ground Land

There are totally 12 escape stairs at the appropriate locations.
They are connected to the isolated 4 hours F.R.P. refuge floor at the bottom of the building.
There are 4 escape stairs at two ends of the refuge floor to rerect people to land on to the banks of the Shenzhen River.
The structure of the rest of the building will be sprayed with fire rating materials to with stand the 2 hours F.R.P.. People are supposed to get off from the building within 2 hours before the structure of the building is falling down on to the structure of refuge floor.

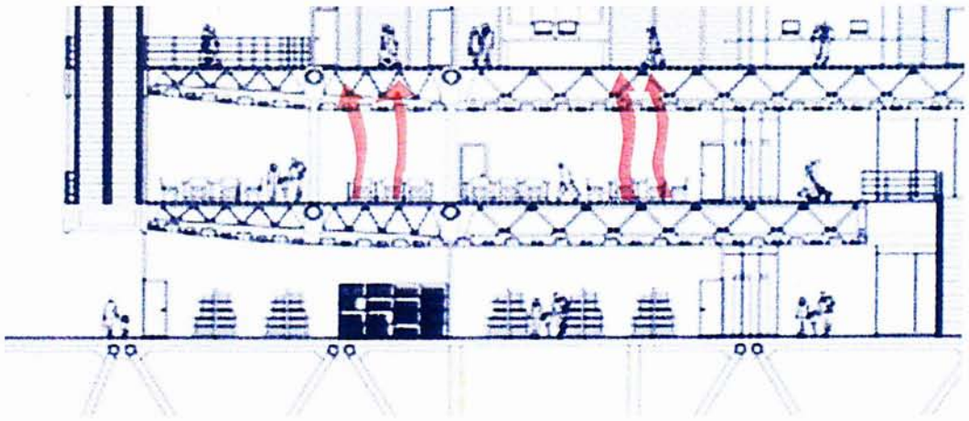
## Fire Engineering

**Smoke will rise to high ceiling and people leave before it falls down**



The high roof at the atrium will high enough for the smoke to reach the top and at the same time people will then have enough time to leave the atrium before the smoke falling down to the floor again.

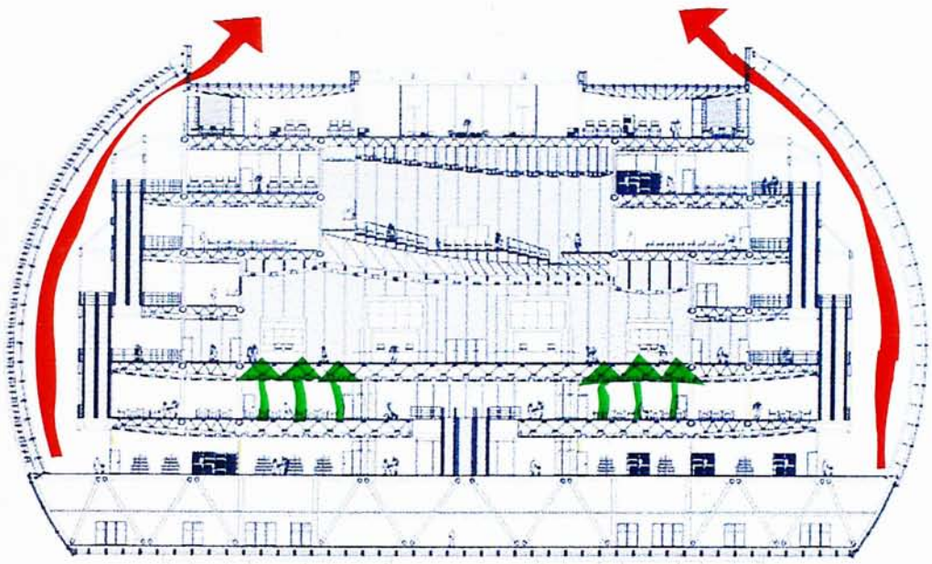
**Mechanical Ventilation System will turn into Smoke Extraction System in case of Emergency**



The kitchens will be enclosed by the 4 hours F.R.P. materials to reduce the fire hazad tranfer to the area next to them as kitchens are the only areas have highest potential to be on fire.

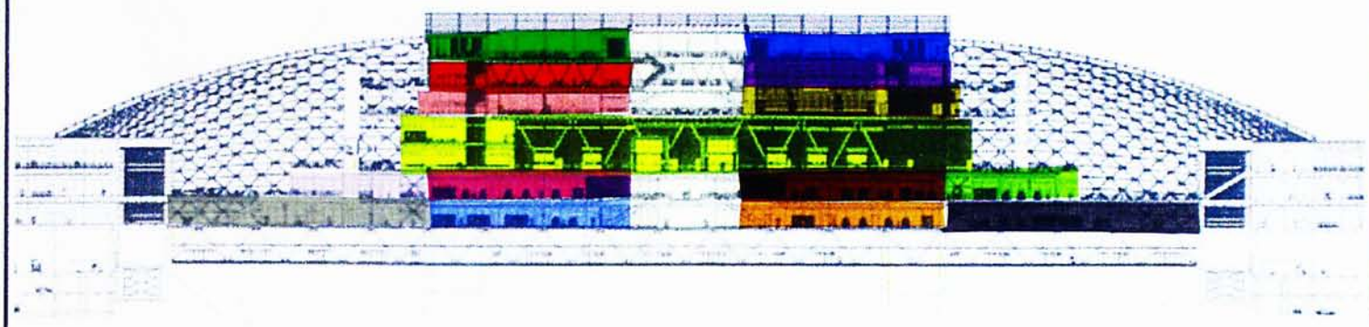
## Fire Engineering

**Smoke Extracted by Mechanical Fans At Roof and False Ceiling**



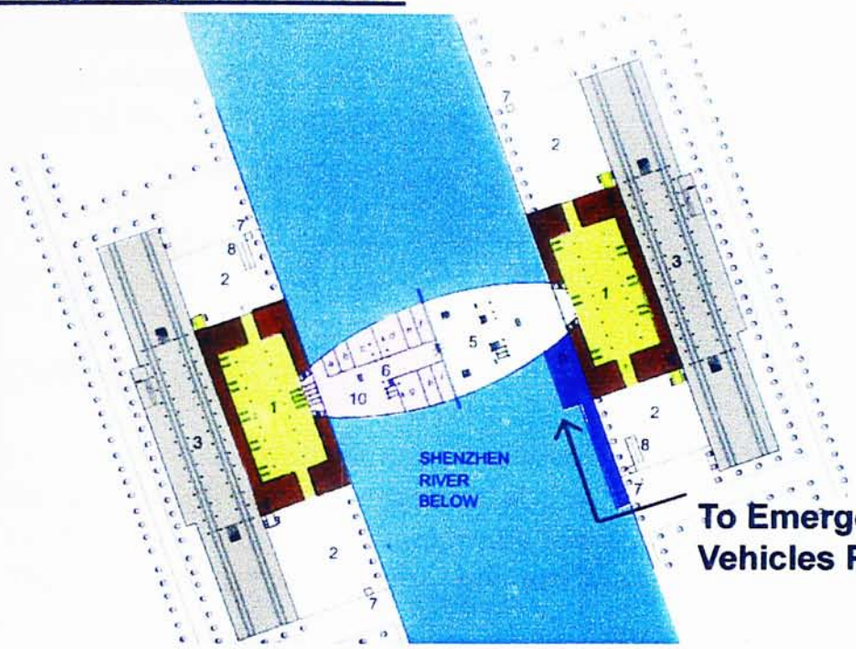
The ventilation fans at the roof of office floor and inside the false ceiling of the kitchens will be turned into smoke extraction system to pull off extract the smoke out of the building.

## Compartmentation



The building will be subdivided into different zones.
People in the on fire zone will be directed to leave the zone first through the fire escape stairs to the refuge floor.
People in the other zones will then follow the instruction to leave the building after.

## Firefighting Installation



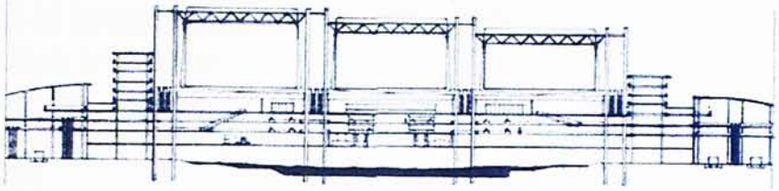

**Emergency Vehicles Platform +13.500**

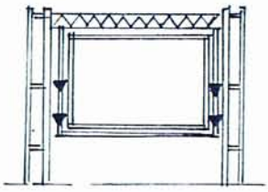
5 **Refuge Floor +13.500**

A separate emergency vehicular route and station plaform connect to the refuge floor are provided for the firemen to access the building through the refuge floor.

## Structure

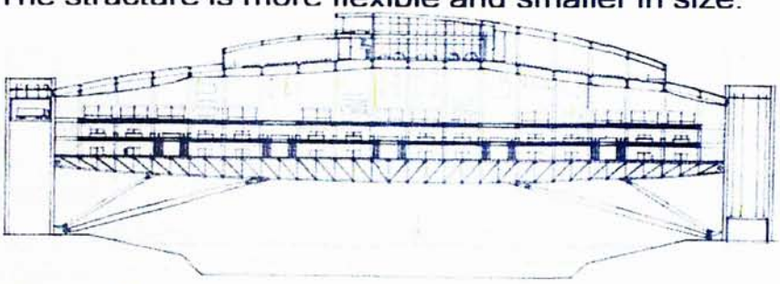
The statutory constraint for the construction on the river is that there must be minimum 40 - 60m of separation in between the two structural members in the water. That is 40 -60m wide of the water must be structural free.

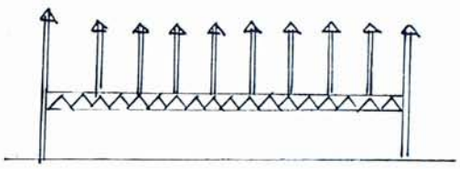




**Option 1**

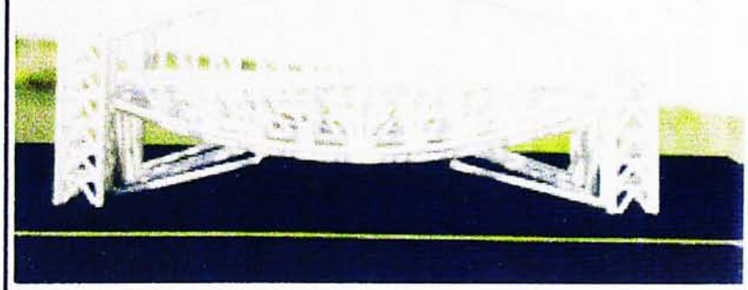
Put two sets of columns onto the water which is separated about 60m apart. Then span the truss between the columns at the top. Use tension members to hang the boxes of exhibition halls and auditoriums by the truss at the top.
The structure is more flexible and smaller in size.





**Option 2**

In order to make the river to be totally structure free across the river, the building may erect the big supporting columns on both sides of banks of the river. Afterward, construct a 6-10m deep truss on top of the columns that will act as transfer slab. Then it could put up columns and beams on top of the transfer slab. Above the transfer slab, it would just like doing conventional construction on the ground.
The structure is too much like a typical construction on ground and less likely a building on the water.

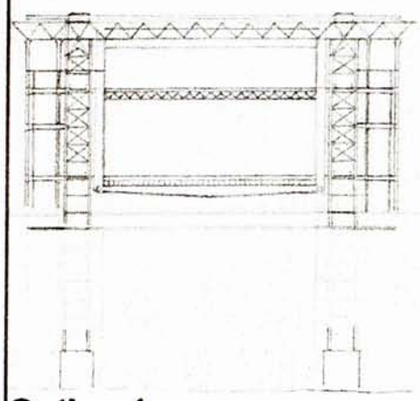


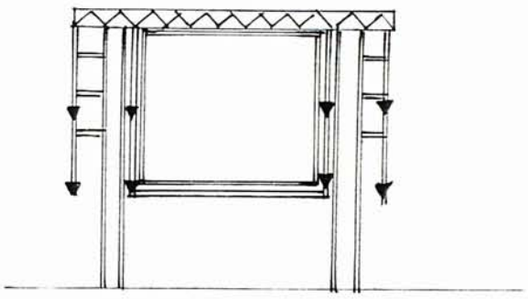
**Option 3**

It could construct a 6 floors high bridge structure across the river and then spans the floor slabs inside the bridge structure of truss.
the structure is very large and less flexible to shape the space inside the structure as it is too rigid for plans and elevations.

## Structure

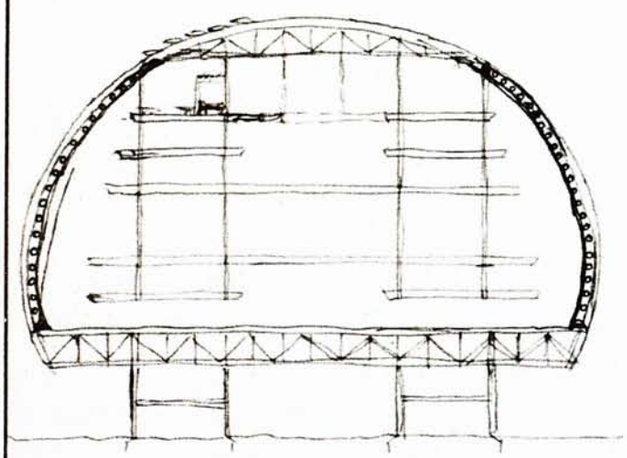
It is because the structure of putting the big columns into the river could help to miminize the size of structural members spanning across the building. Moreover, the division could help to break down the massing of the building into 3 segments. Therefore, this structure system is chosen.
The next step is to study how could the building spans onto the columns in the water.





### Option 1

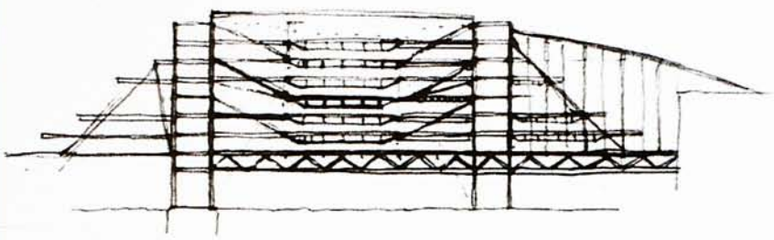
Construct a big truss on top of the columns and then hang a structural box from the truss. It could use tension members to hang the floor slabs between the outsider elevations and the columns.
The structure is elegant but the structural box of exhibition and auditoriums and the truss at the roof will be very expensive.



### Option 2

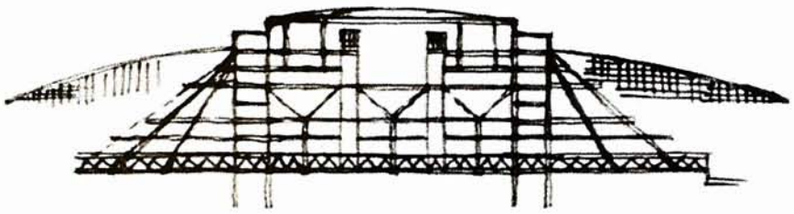
Construct a 6m deep truss transfer slab on top of the columns. Then builds the curved H-section columns on top of the transfer slab to support the big truss at the roof. Afterward, hang the floor slabs by the tension members from the roof truss.
The curved H-section columns will be very large and block the view of elevations.

## Structure



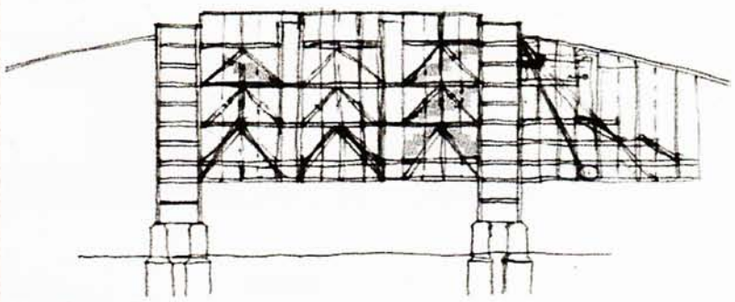
### Option 3

A 6m deep of truss is built to span across the columns. A separate tension member systems by the columns to hang the floor slabs above.
The separate structure of truss at the bottom is good to isolate the refuge floor from the building above.
But the angles tension members and the span of the floors by tension is not efficient enough.



### Option 4

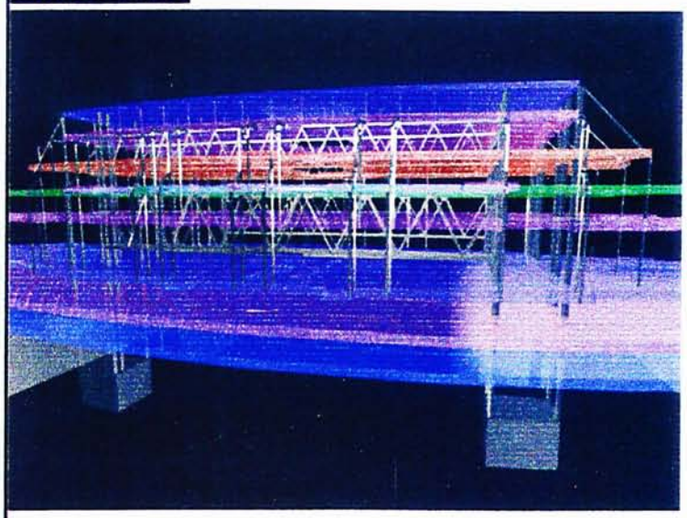
The service zone and refuge floor would have separate 6m deep truss slab to span across the columns. It would build two big trusses at the mid-level and the roof. The floors beneath these truss will be hanged by tension members from the trusses. The floors at two ends will be hanged by tension members connected to the main structural columns.
The trusses members at mid-level will have less load to be supported and hence could be less expensive and easily to be designed. The design of plans at each floors will have less constrain as the structural system is more flexible.
The truss at the roof will be too large that will make the roof looks like too heavy.



### Option 5

Spanning three 10m deep trusses between the columns to support the floors. Using tension members from main structural columns to hang the floors at two ends.
The 3 big trusses is redundant and too expensive.
The structure of refuge floor cannot easily separate from the rest of the building.

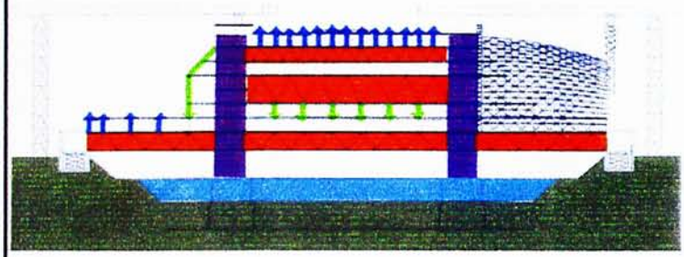
## Structure



### Final Structure Solution

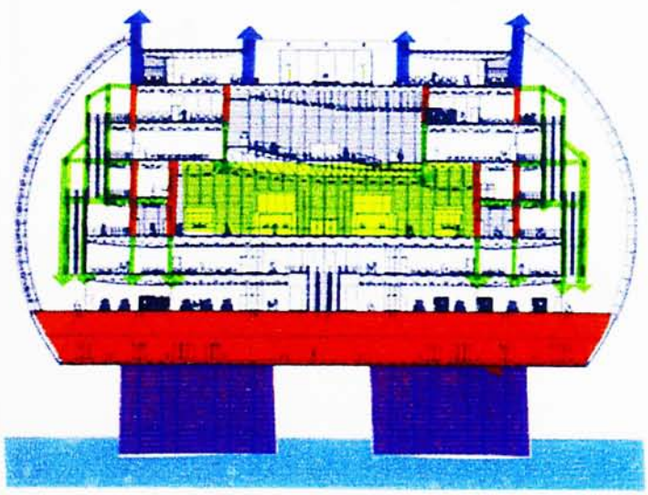
The refuge and service zone will be supported by 6m deep truss slab connected to the main structural columns. Therefore, it could easier to design the insulated 4 hours F.R.P. refuge from the rest of the building.

A 10m deep truss is built to support the box of exhibition hall. The floor underneath the exhibition will be hanged by tension members from the big truss above. The top of the 10m truss would support the floor at the top of the truss.



A 5m deep truss is used to spport the two floors at the top. columns will sit on top of the 5m truss to support the roof.

The floors at 2 ends will be hanged by tension members fromthe main structural columns. The rest part of the floors will be supported by columns sitting on top of the 6m deep truss of refuge floor.

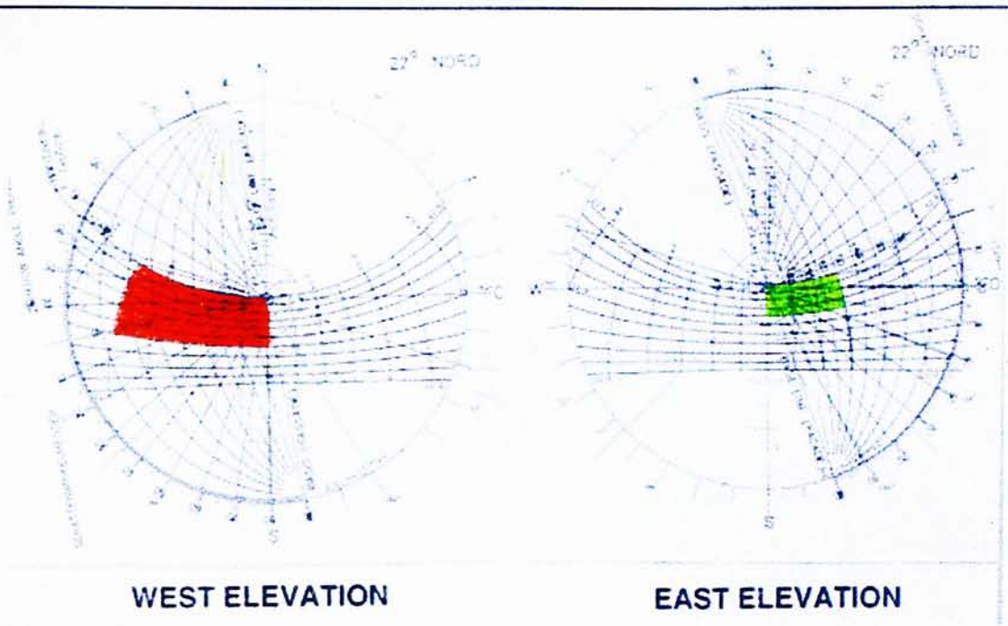


Such structure system will make the floor plans design more flexible and less expensive. Moreover, visitors could see and pass through the big trusses. It would let people experience and know the structure of building.

The rigid solid box of the exhibition hall will act as shear wall to brace the structure.

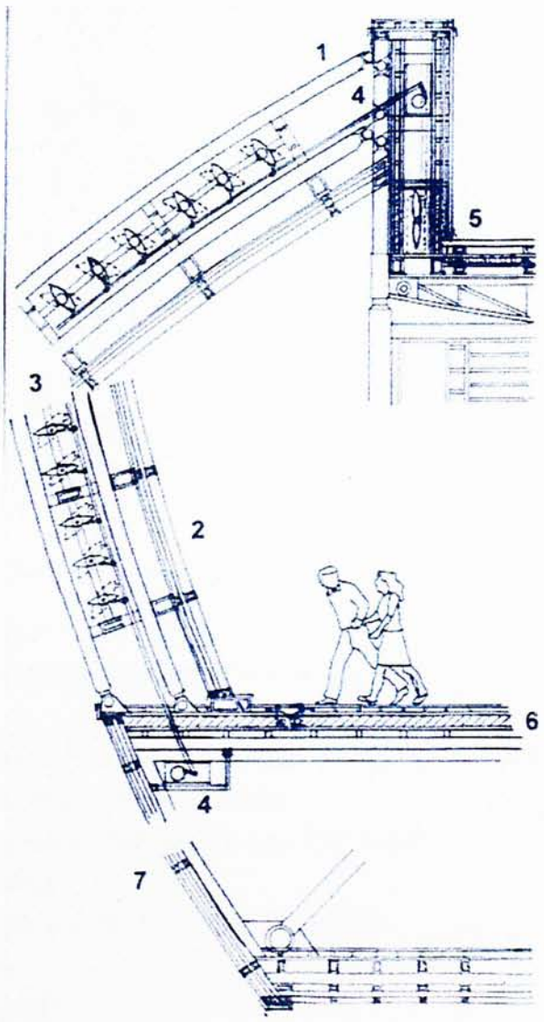
**Primary columns**
**Secondary columns**
**Primary truss**
**Tension**
**Shear Wall**

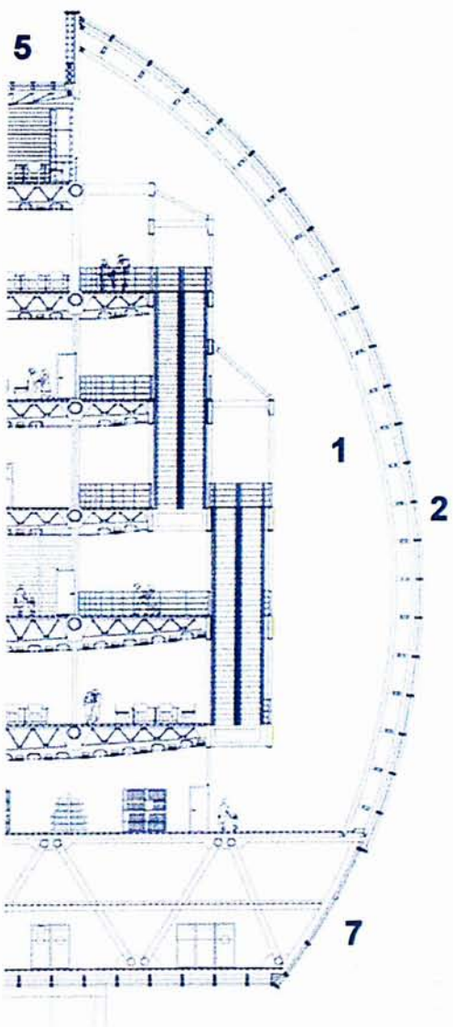
## External Skin



WEST ELEVATION

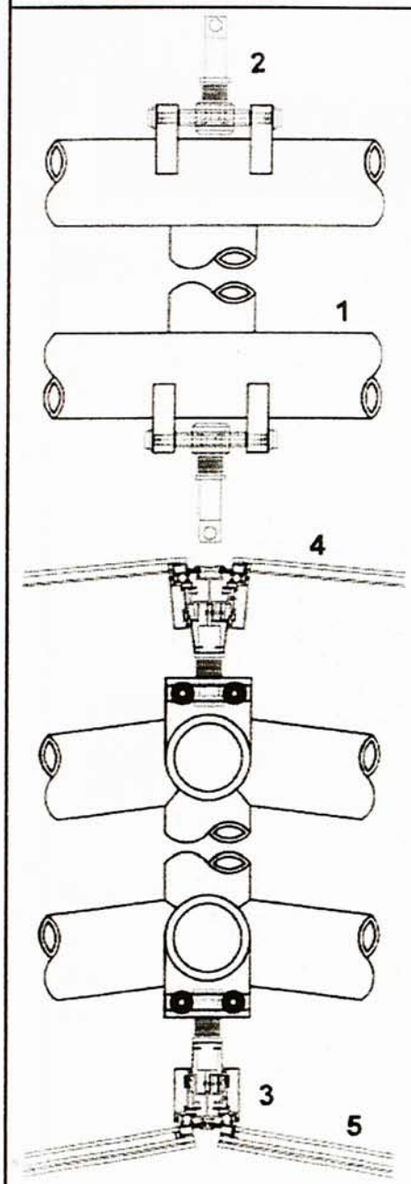
EAST ELEVATION




1 Secondary Structure for Curtain Wall
2 Double Layers of Liminated Glass
3 Rotateble Perforated Metal Louvers
4 Computerized Louvers Controllers
5 Mechanical Fan for Hot Air Extraction
7 Aliminium Claded Metal Panels

## External Skin

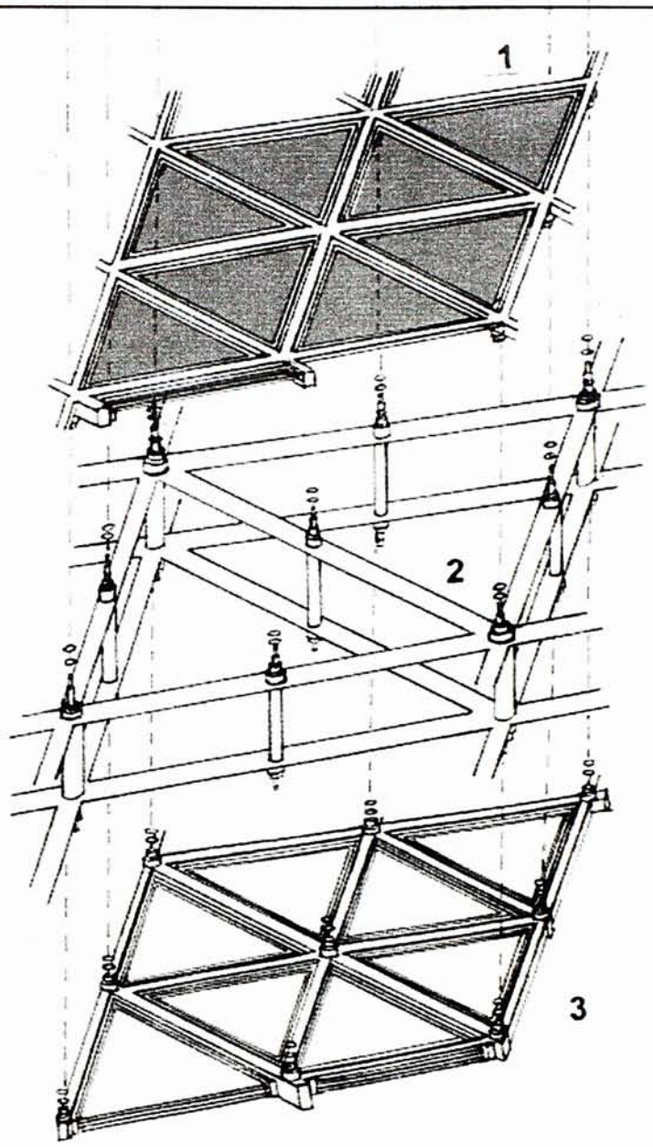


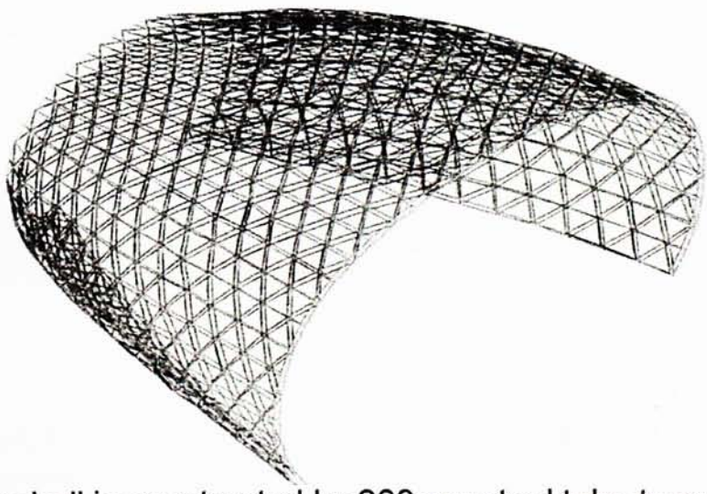

**Top Left:**

**1 Secondary Structure for Curtain Wall**
**2 Window Frame Support Details**
**3 Window Frame Details**
**4 Perforated Metal Panel for Sun Shading**
**5 Double Layers of Laminated Glass**

**Top Right:**

**1 Perforated Metal Panel for Sun Shading**
**2 Secondary Structure for Curtain Windows**
**3 Double Layers of Laminated Glass**



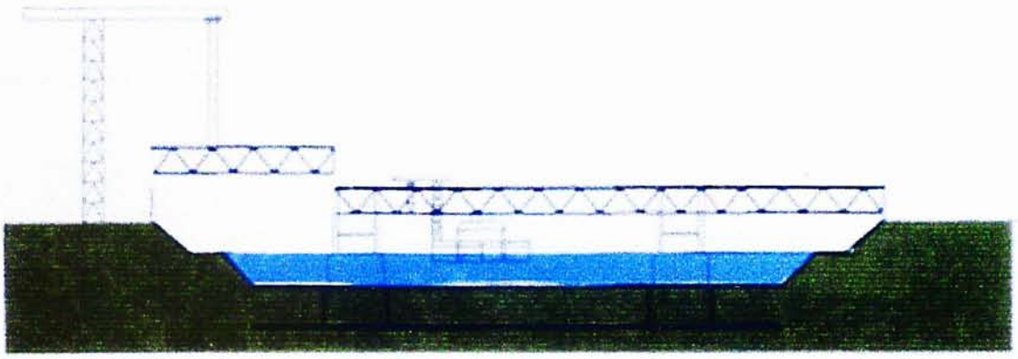



The shell is constructed by 200mm steel tube to organize it as a triangular latice shell.
There are 2 layers of shell to deepen the effective thickness to become 1.2m so that it could span across 80m. It works as if it is a trangular spatial frame.

## Construction Sequency

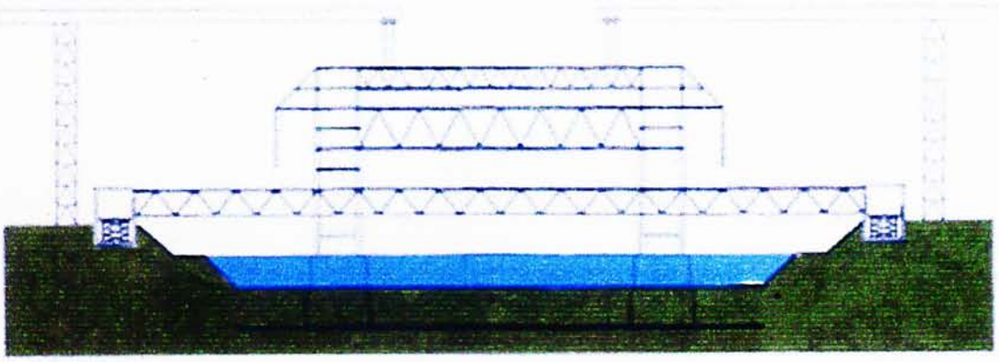
**Step 1**

Working on site formation.
And then building foundation and primary structural columns.



**Step 2**

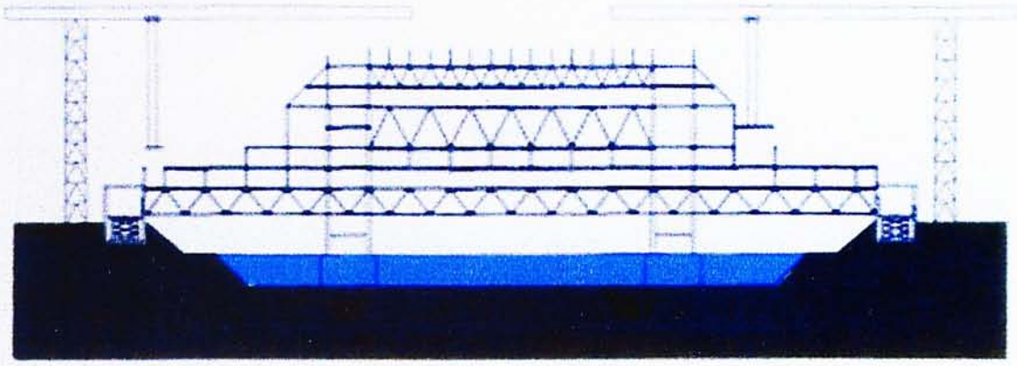
Assembly the precast truss for the refuge floor.
And use it as elevated workingplatform for further process.



**Step 3**

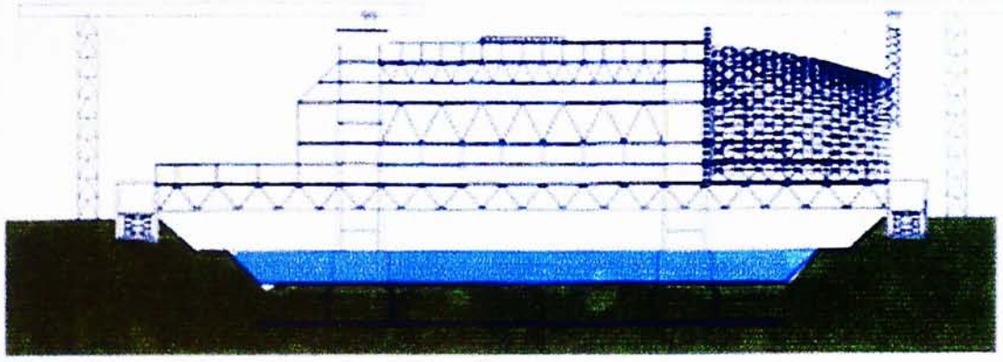
Assembly the precast truss onto the column to work asmain structural members.
Put the tension members onto the columns.
Make the loading platform for transportation of goods.

## Construction Sequency



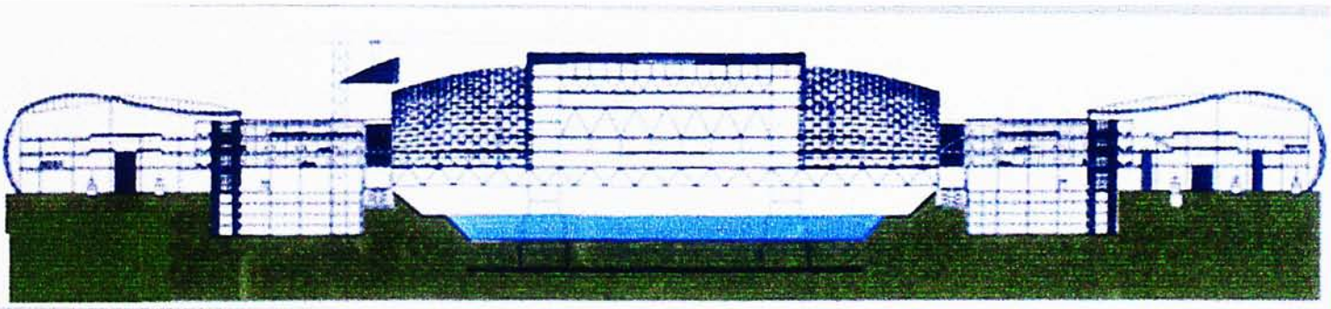
**Step 4**

Hang the precast truss onto the main structural truss.
And erect the columns onto the structural truss to support the floor.



**Step 5**

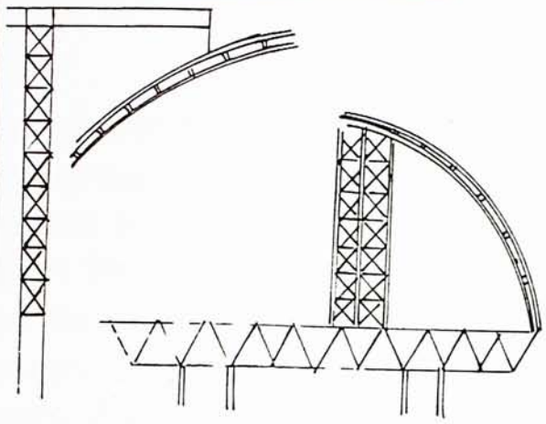
Put the precast truss onto the columns on the main structural truss to finish the roof.
Asembly the roof at two ends by subdividing it as numbers of arch.



**Step 6**

After finish the construction of custom hall, put the last pieces of roof onto the roof of the custom hall to form the skylight of the atrium.

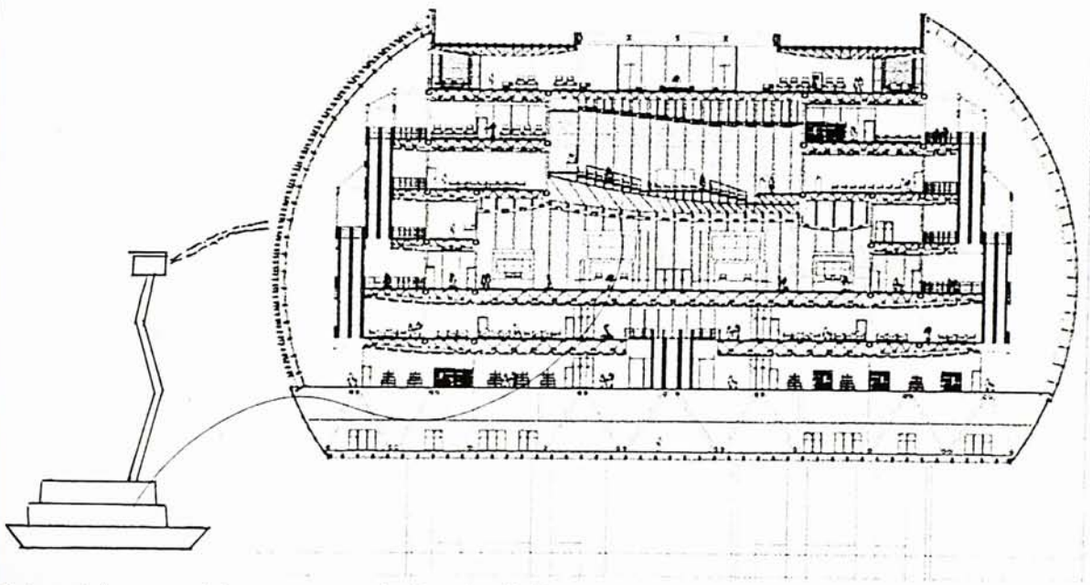
## Construction Sequency



### Construction of the Arch of the Shell

Each Segment of arch will be divided into 2 pieces.
Fixing half of the arch by temporary structure.
Put the other half of arch to finish the 1 segment of arch.

## Maintenance



A boat is used to approach the building.
Use the elevated mechanical arms to clean the elevations of the building by man.

# Content

## Background

### North West New Territories Development Strategy Review, Consultation Paper 1990

Foreward

It is apparent that the NWNT would evolve as a strategic growth area for industrial and economic development bearing in mind the close economic linkages between Hong Kong and the Pearl river delta region. The review of the NWNT Development Strategy is given top priority in order to capitalize the development opportunities in the NWNT.

Existing land uses in the rural hinterland include conservational and recreational areas such as Country Parks, Sites for Special Scientific Interests and Countryside Conservation Areas. Also included but mainly in lowland areas are agriculture, fish ponds, villages, workshops ,factories and community uses. There are at present 4,400 ha of agricultural land in the rural lowland areas but already over 900 ha (about 20%) have been converted to urban - oriented land uses. Many are left fallow and some 230 ha are being used for open storage which cause problems of nuisance, flooding, visual intrusion and traffic congestion, etc. The type of open storage uses include construction material and equipment (86 ha, 37%), motor vehicles (56 ha, 24%), containers (40 ha, 17%) and rattan, bamboo and timber products (23 ha, 10%).

Base on the Study on Port and Airport Development Strategy (PADS), it recommended special industries area of 626 ha in the NWNT for the year 2011.

Existing Problems

(1) There is great demand for urbanized land uses in NWNT to take advantage of improved transport links with the industrial development in Shenzhen. There is also great pressure for development along major road networks as a result of improved accessibility of NWNT to the main urban areas.
(2) Pollution arising from uncontrolled development in the NWNT and across the border has resulted in environmental degradation particularly in the Deep Bay area.
(3) Uncontrolled development and change of land uses in the NWNT have significantly affected the drainage of the areas causing flooding problems to the low-lying areas.

Anticipated Problems

(1) The possible development needs from PADS and the economic growth across the border would nacres the competing demand for land in the NWNT. The NWNT is also well positioned to get a major share of industries to be thinned out from the Metropolitan Area.
(2) Efficient road network, other transport systems and infrastructural improvements are needed to serve the possible land use proposals arising from PADS and other development.
(3) With increased urbanization pressure and competing demand, conservation of rural character of the NWNT would be more difficult. Recently introduced Interim Development Permission Areas (IDPAs) would only be a partial solution.

## Background

Broad Goal and Principal Objectives

(1) To tackle the existing and anticipated problems in NWNT, it is considered essential, in the review of the NWNT Development Strategy, to strike a balance among the various competing land use requirements. In essence, the aim is to produce a long term comprehensive land use - transport - environment plan that would co-ordinate the development new town and rural areas, and bring about a better organized and more desirable living and working environment within the limits of resource availability.
(2) Provide adequate opportunities to accommodate demand of land for economic development.
(3) provide and efficient transport system to serve all existing and planned development.
(4) Sort out land use patterns to create more acceptable urban, rural and marine environments with a view to minimizing net environment impacts and to maximizing opportunities to improve existing environmental qualities.
(5) Conserve and enhance major landscape and marine attributes and important heritage features.

**Territorial Development Strategy 1996**

**Development of Futian District of Shenzhen**

(a) The city's original Special Economic Zone, with an area of more than 3200 sq.km, was set up in 1979. Since 1980, industrial districts or science aid technology parks have been set up in the districts of Shekou, Shangbu, Baqualing, Huaqiao Town, Nanton, Futian and Shatoujiao.

(b) Since 1991, the government has adopted some measures to improve Shenzhen's investment environment, e.g. ***constructing large-scale infrastructures***, further expanding the existing securities market, and setting up a duty-free raw materials market and two bonded districts bordering Hong Kong (***Futian*** and Shatoujiao). ***A bonded district is similar to a free trade zone where imports and exports do not need to pass through custom***. In addition, investment projects in the services sectors, including the property sector, will be encouraged.

It is hoping that such development will attract many business parties from Hong Kong, Taiwan and the foreign countries to invest at there. The main focus industry developed at there will be some textile, garment, electric, information technology and mechanic, etc.

Metro-Railway Development Plan in Shenzhen

It is hoping to help the future development of Shenzhen through the proposal of the underground metro–railway will be constructed in the future years. This railway will go through the busy heart of Futian district and hence help to develop the efficient mass transportation for the future development. Therefore, there will be a planed railway terminal at Port of Huanggang in Futian next to the Shenzhen River.

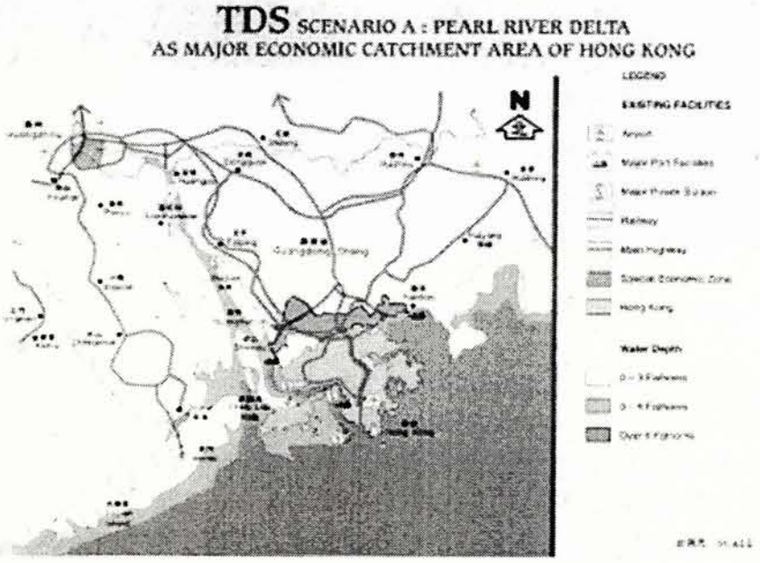
## Background

**Railway Terminal and Second Cross Border Facility at Lok Ma Chau**

Background

Development and Investment in Pearl River Delta:

In the recent years, there is a trend showing that Hong Kong is increasing the level of cooperation with the Mainland China especially with the Pearl River Delta (PRD) in term of industrial production. This is the result of the consideration of efficiency of labor force investment, cost, and also political reasons. Such kind of cooperation will exist in the form of investment of branch factory plants and also Partnership with the business parties from the Mainland China side. Hence, Pearl River Delta and far more extend to some places at Guangdong will become the main area of the economic catchment



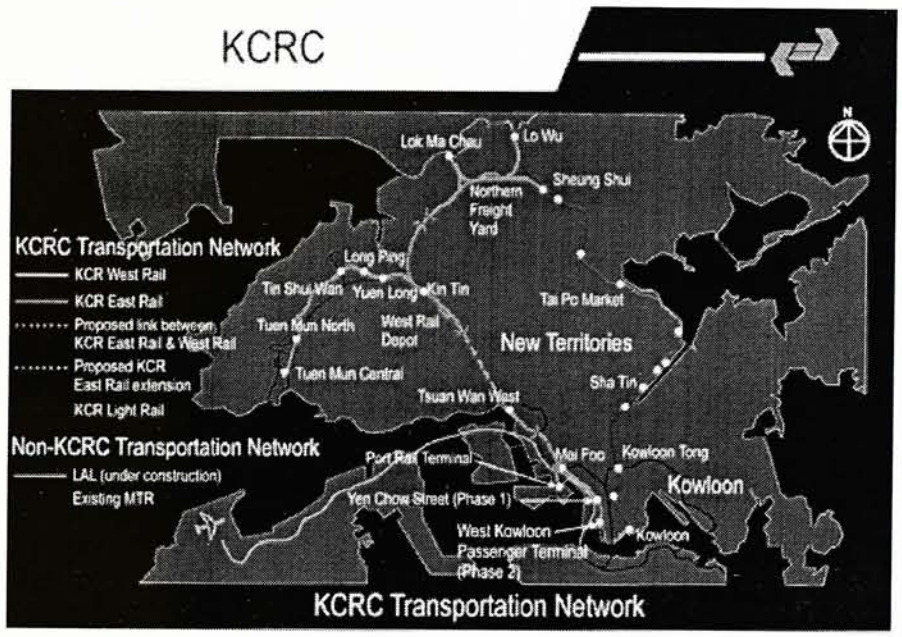

Redistribution of Population of Hong Kong

There is a strategy proposal for the development of Hong Kong. The Government will develop the North-West area of the New Territory into the new residential community area. This is planning to redistribute the population of Hong Kong and try to decentralize the communities. It is also the need to house the future rapid expansion of the population of Hong Kong as there are al lot of people qualify to become the Hong Kong residents after 1997.

## Background

### The Need of KCR West Rail

It is therefore having the new west railway now under the planning. It is hoped that such proposed railway will help to ease the traffic problem now happen in the north-west district in the New Territory. At the same time, the proposed railway is part of the programs of the future development of the north-west New Territory. The railway will integrate into the proposed development and become the major transportation system at these areas.




### The Second Cross-Border Passenger Terminal

It is because there is an increasing trend to have more business in the related trips with the Mainland China in the past few years; hence, the cross-border passenger flow has been increasing rapidly. At present, cross-border service operates to and from a single passenger border crossing at Lo Wu. However, the rapid increase in the cross-border passenger flow has been causing pressure on the immigration, customs and transport services at this port, and the land traffic flow to and from the port is a major cause of traffic congestion in the Lo Wu center of Shenzhen. Therefore, there is a need for a second passenger crossing.

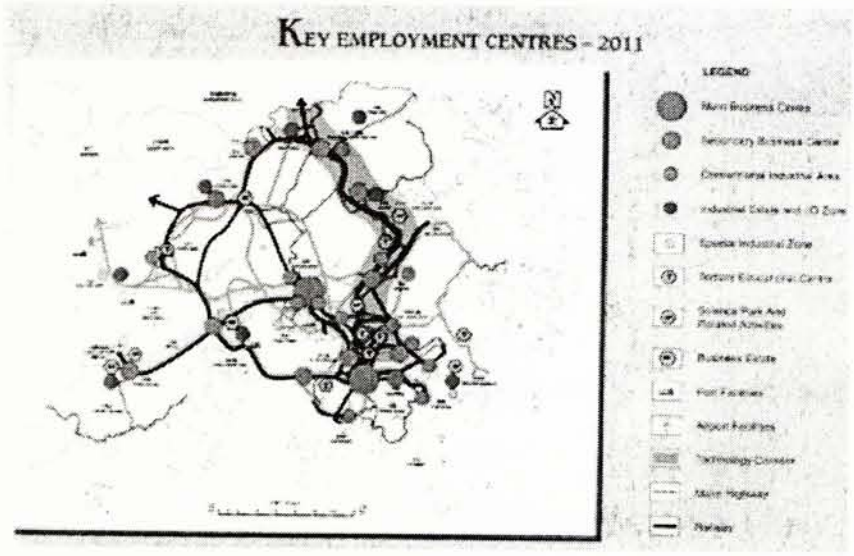
### Special Industrial Zone in Lok Ma Chau

Lok Ma Chau development is under planning in the Long Term Territorial Development Strategy of Hong Kong. It will be developed to become the special industrial zone. In the analysis of Territorial Development Strategy Review (1995) of Hong Kong by the Hong Kong Government, Lok Ma Chau is a New Land-Based Site broad type with a potential population capacity of 10,000. Therefore, it will have a parallel development of Industrial and Residential in Lok Ma Chau.

### Hong Kong Technology Corridor

The long strategy for the future industrial development of Hong Kong will go for Hi-Technology direction. Therefore, the government proposed to develop the areas along the existing East-Railway to become the Technology Corridor. However, such kind of development will certainly relay the industrial production at Shenzhen especially at the area of Futian in the future. Therefore, the cooperation between Futian and Hong Kong will be increasing in the field of Hi-Technology.

## Background- The Need




**Proposal of Lok Ma Chau West Railway Terminal**

According to the KCRC internal Railway Development Study (RDS) report, the following are discovered.

Forecast Demand

Base on the Railway Development Study (RDS), he resulting daily cross-border rail patronage forecasts for Lok Ma Chau and Lo Wu the following assumptions were made:

(1) Lo Wu's border facilities are at the capacity by 2001 and most increased border traffic would be handled at Lok Ma Chau.
(2) Lok Ma Chau and Lo Wu border crossing facilities will offer similar qualities of service and hours of operation.
(3) Shenzhen will have in place sufficient immigration/customs facilities as well as feeder infrastructure, e.g. Shenzhen Metro to support the Lok Ma Chau Terminal.

Cross-border Options

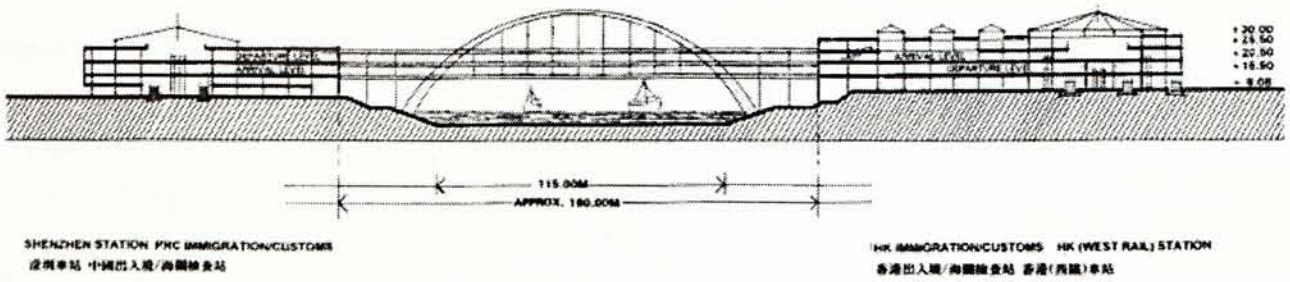
Lok Ma Chau Terminal will be the West Rail northern terminals, located at the border with the PRC. Architectural treatment will be especially important, both with respect to its character as a symbolic structure linked directly with The Shenzhen Passenger Terminal, and the need to accommodate smooth passage flow through its various functional areas. Lok Ma Chau and Huanggang Terminals will employ a similar scale, configuration, and choice of materials to effect the appearance of a single, jointly design complex.

Separate Levels

When it compares to the passenger circulation exists in the other cross-border station at Lo Wu, it will find that there is congestion at some times. To avoid this situation occurs in the future Lo Ma Chau Terminal, KCRC proposed to provide the vertical access to the customs and immigration halls, with departure and arrival halls on different levels to minimum the footprint area.

The bridge will be start at the level of +15.50m from principle datum.

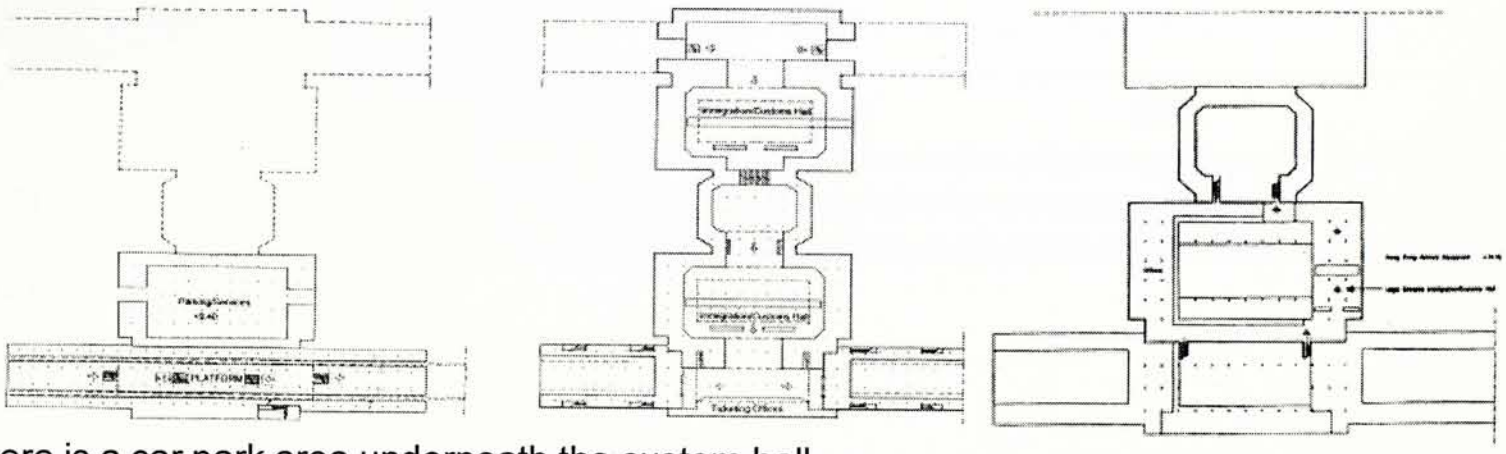
## Background- The Need




Custom Services

As it is a point for the future cross-border station, there will be custom services from two places to let people can go into the either places.

The two custom services departments will directly attach onto the station at the exit of both of them. The design of the custom department is the need for the passengers to queue up for immigration outside the platform and beyond the ticket barriers and it is considered in the layout of Lok Ma Chau terminal.



There is a car park area underneath the custom hall.

Moreover there is a separate circulation on top of the custom hall, which serve for Legal Entrants Immigration/Custom Hall.

Access to Terminal

There is no forecast need for access to Lok Ma Chau Terminal on Hong Kong side buses or taxis, but roads will be provided for employee and service access. On the PRC side there will clearly be need for efficient means of transferring passengers to the future Shenzhen Metro as well as other road public transport.

Capacity of Cross-Border Facilities

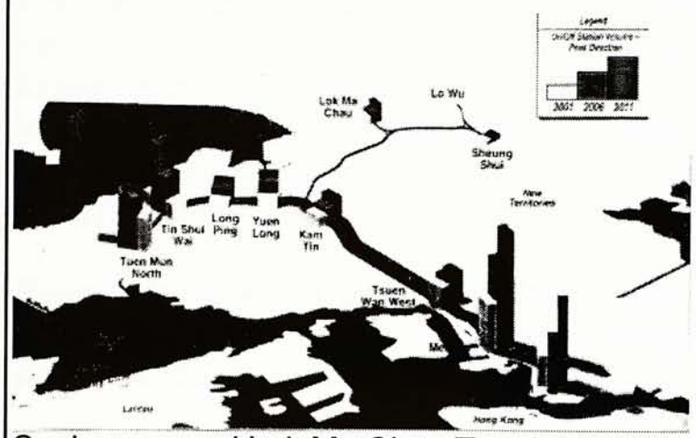
Now, the design capacity at Lo Wu is an average of 125,000 passenger per day for both directions, but more than 170,000 passengers currently cross the border on the festival days at Lo Wu. Forecasted annual patronage in year 2011 is 89,500,000 to over 100,000,000. This would result in an average minimum daily patronage of 260,000 rail passengers.

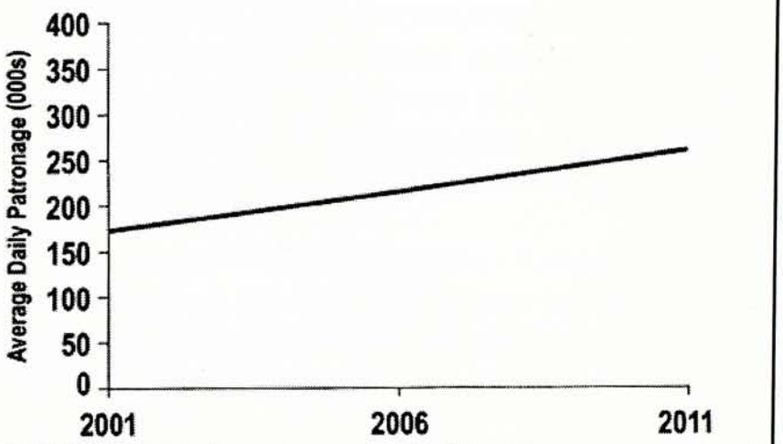
The maximum Daily Passengers is 190,000 in one direction from North or South and at the special days like Chinese New Year, there will be maximum 250,000 passengers crossing the border. The maximum hourly flow will then be 20,000 passengers per hour in one direction.

## Background- The Need

The scheme provides a significantly less convenient service to public, particularly in the early years, with lengthy pedestrian movements across the river channel and to the existing joint immigration and customs inspection building. While this scheme provides no budget relief to the West Rail in the early years, assuming a phased expansion of the cross-border facilities will be necessary.

Hence the Government's Rail Development Strategy proposes a second rail passenger border crossing at Lok Ma Chau to accommodate the increase.

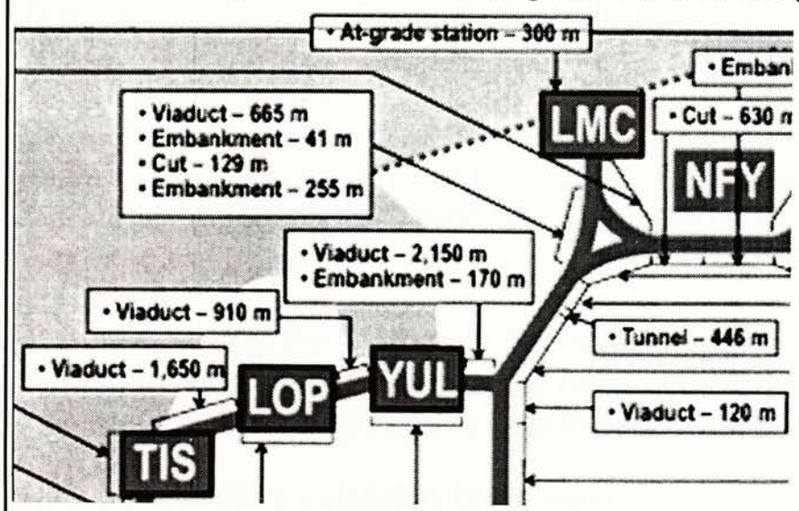


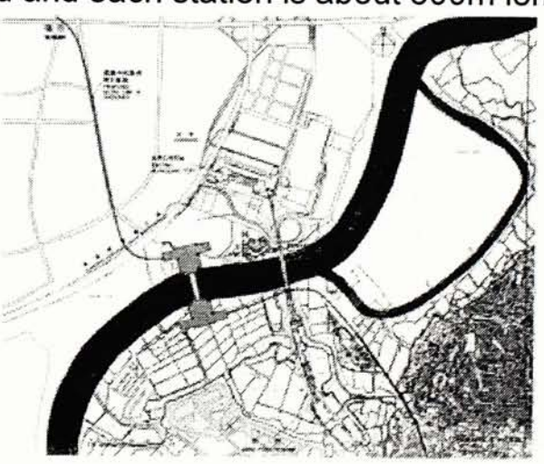




Such proposed Lok Ma Chau Terminal will be integrated into the planning of West Railway project. The proposed terminal will be connected to the Shenzhen future metro-station at the Port of Huanggang at the opposite side of Shenzhen River. And there will be a customs services in between the two terminals.

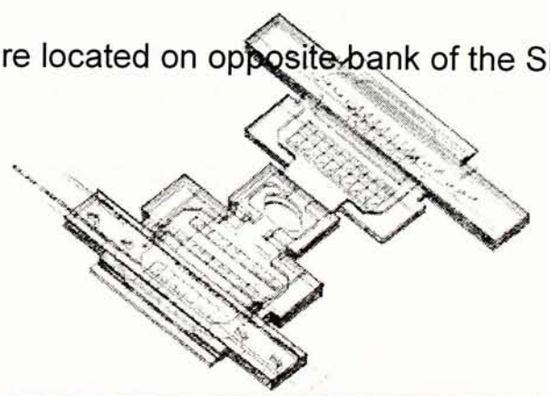
Station on Ground

The two railway stations will be at grade level of the ground and each station is about 300m long.



The two stations will be parallel to each other and are located on opposite bank of the Shenzhen River.



## Project Introduction

### Lok Ma Chau –TDC Congress Center:

This is a proposed complex located on border of Lok Ma Chau and Futian District of Shenzhen between Hong Kong and Mainland China.

Inside the building, there will be some small congress auditoriums which will held the related conference and any business exhibitions for the needs of both Government or business parties from Hong Kong and Mainland China especially for Shenzhen Government. It is also a place for the future development of Shenzhen economy to promote themselves toward the international level especially to the foreign countries as well as Hong Kong and Taiwan. Therefore, more and more investment will hope to be developed at that place by the interested people. It is hoping that such congress center will allow having more in deep communication between the people from two different places of culture and bridging the gap between them and learning from each other.

People who have the Hong Kong Identity Card or the Shenzhen I.D. Card could enter to the Congress Center without the need to cross border. Therefore, it is a convenient point to attract people to visit the proposed Congress Center.

The proposed congress center is trying to respond the future development of Technology Inductries and the Investment in Pearl River Delta. Especially the government of Hong Kong emphaize the importance of development along the North-west part of Hong Kong which will directly link to the region of Pearl River Delta.

## Client Profile

### Trade Development Council (TDC) and Cooperation with the Related Departments:

The proposed congress center will be owned by and financial supported by the Hong Kong Trade Development Council that acts as the client. As it will be incorporated into the two railway terminals and also the customs services for both sides, the client and architect will closely cooperate with the KCRC, Shenzhen Metro-Station and the Customs and Immigration Departments of both Hong Kong and Shenzhen sides.

At the same time the Shenzhen Economic Development Department will act as the consultant to provide sufficient information for the need of the future commercial and industrial center at Futian. Such co-operation will obviously help to design a well equipment congress center for the future uses.

TDC is the territory's statutory body, established in 1966 and responsible for promoting and expanding Hong Kong's trade with the world, imports as well as exports,
TDC is the international marketing arm for Hong Kong's manufacturers, traders and service providers,
TDC is a global organization, with 51 offices in 34 countries and regions.

## Client Profile

### Missions and Objectives of TDC:

To help develop and diversify markets for Hong Kong companies,
To enhance the image of Hong Kong and Hong's products and services in the world's markets
To strengthen Hong Kong's lead as Asia's capital for trade fairs and exhibitions
To further enhance Hong Kong's international image as an open market and fair trader.

### What TDC Does:

Organize and take part in over 300 promotional events worldwide each year,
Run a global on-line trade enquiry service with over 624,000 business contacts which helps users find the right supplier, buyer or trader in Hong Kong,
Publish trade publications and product catalogues providing sourcing information in key Hong Kong industries,
Organize 20 trade fairs and exhibitions in Hong Kong attracting 1.2 million visitors,
Hold high level international seminars promoting Hong Kong's advantages as a business base in Asia,
Organize business missions to and from Hong Kong,
Stronger emphasis on quality and presentation,
Formation of strategic alliance with international fair organizers,
Tailor-made conference and workshop programs at the fair,
International road shows and marketing campaigns,

### How TDC Can Help:

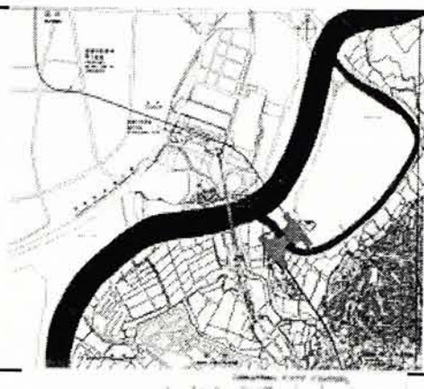
The TDC is offering the following services to international media covering the 1997 Annual Meetings of the World Bank and International Monetary Fund.

A databank of business people willing to do interviews about Hong Kong's economy, presents status and future prospects. Contact names, numbers and a brief description of the type of business and the key points the business people will make. These are small and medium sized businesses, the back-bone of Hong Kong's economy.
Interviews and SoundBits with senior TDC executives on various aspects of Hong Kong's economy and trade including: trade with China, future competitiveness, Hong Kong as Asia's business hub and services center, Hong Kong's trade fairs, fashion industry etc.

## Site Selection And Context

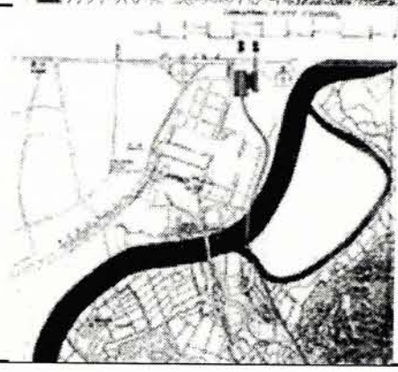
There are 4 proposals for the future railway terminals composition located between Lok Ma Chau and the Port of Huanggang. They all have different advantages as well as disadvantages respectively.

option A



option B

option C



option D

| Scheme | Advantages | Disadvantages |
|---|---|---|
| A | Shorter rail for Shenzhen Metro, thus less capital and operating cost.<br><br>The proposed Huanggang Station will be located in Shenzhen, no land jurisdiction problem.<br><br>Road access for passenger transport to Huanggang Station in Shenzhen side needs detailed assessment although seems less problematic as compared to scheme B.<br><br>The Huanggang Station will be inside the commercial and industrial district of Shenzhen that will provide good relationship to the proposed congress center | Longer rail and access road for West Rail, and more capital and operating cost.<br><br>Longer and higher bridge crossing due to the widened Shenzhen River channel after river training as well as the Third degree navigation standards of PRC. More capital and operating costs, less convenient for passenger flow on long pedestrian bridge over Shenzhen River. |

## Site Selection And Context

| Scheme | Advantages | Disadvantages |
|---|---|---|
| B | Shorter rail and access road for West Rail, thus less capital and operating cost.<br><br>Short pedestrian bridge crossing to Huanggang Station and hence more convenient for passenger flow and less capital cost for station. | Longer rail alignment for Shenzhen Metro, thus higher capital and operating costs.<br><br>Land jurisdiction and border control and security issues will need to be resolved between Hong Kong and Shenzhen Authorities since the proposed Huanggang Station will be built south of the trained Shenzhen River channel, in an area planned for Hong Kong Government management.<br><br>Road access for other public transport form Shenzhen to Huanggang Metro Station needs detailed assessment. |
| C | The best transportation scheme providing most convenient service to the travelling public.<br><br>The existing port Joint Inspection Building needs expansion.<br><br>**Adjacent land can be fully utilized and provides a hub for new development, commercial and otherwise in this area.** | Close liaison between Hong Kong and Shenzhen is required in order to achieve this scheme. Operating agreement, clarification of cost responsibilities and other institutional issues will need to be addressed and resolved.<br><br>The near term and the long-term development plans in Port of Huanggang area are not well defined. Anticipate some difficulties in railway planning.<br><br>Land use and ownership of land approaching and adjacent to the existing Huanggang port Joint Inspection Building has to be reassessed and coordinated.<br><br>KCRC and Hong Kong Immigration/Customs staff will be required to enter Shenzhen on a regular daily basis in order to operate and maintain Lok Ma Chau Terminal. Special permits may be required for their entry.<br><br>The existing Huanggang joint inspection facilities are not adequate to meet the demand of the forecast patronage at border crossing. Expansion of the existing facilities will be required.<br><br>**Road traffic impact in the area needs to be studied and assessed.** |

## Site Selection And Context

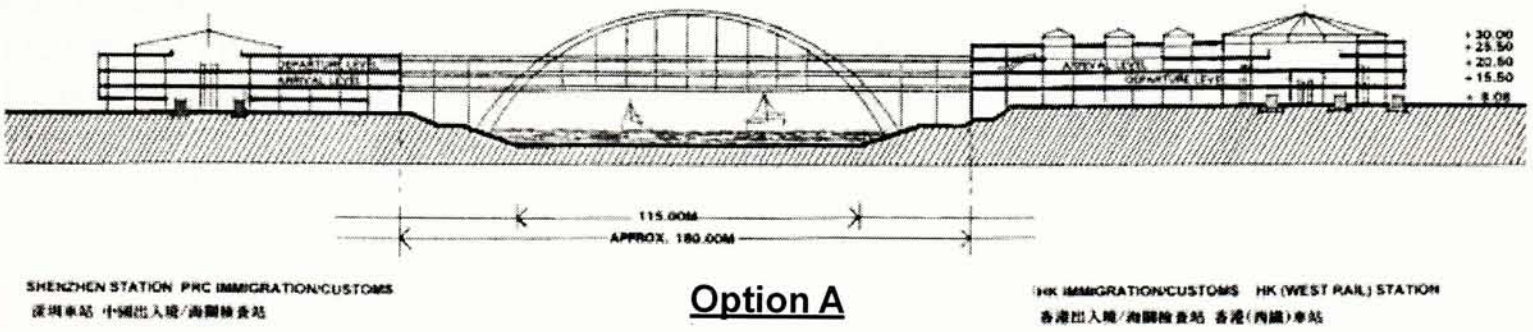
| Scheme | Advantages | Disadvantages |
|---|---|---|
| D | The best transportation scheme providing most convenient service to the travelling public.<br><br>Adjacent land can be fully utilized and provides a hub for new development, commercial and otherwise in this area.<br><br>**It is the closest location toward the already developed Futian city center. Thus it is more convenient for the public to reach the Huanggang Station.** | Close liaison between Hong Kong and Shenzhen is required in order to achieve this scheme. Operating agreement, clarification of cost responsibilities and other institutional issues will need to be addressed and resolved.<br><br>The near term and the long-term development plans in Port of Huanggang area are not well defined. Anticipate some difficulties in railway planning.<br><br>KCRC and Hong Kong Immigration/Customs staff will be required to enter Shenzhen on a regular daily basis in order to operate and maintain Lok Ma Chau Terminal. Special permits may be required for their entry.<br><br>**The railway route will miss the future development next to the bank of the Shenzhen River.** |

**Shenzhen – Lok Ma Chau Congress Center:**

To assist the above development, the proposed congress center will certainly help to promote the future development at Futian. It is a center to show the result of the intimate cooperation of Hong Kong and Shenzhen. Such center will also welcome the foreign investments to promote themselves to the China and also enhance the future opportunity of the development at Shenzhen. It is a place for communication and idea exchange.

**Site Selection:**

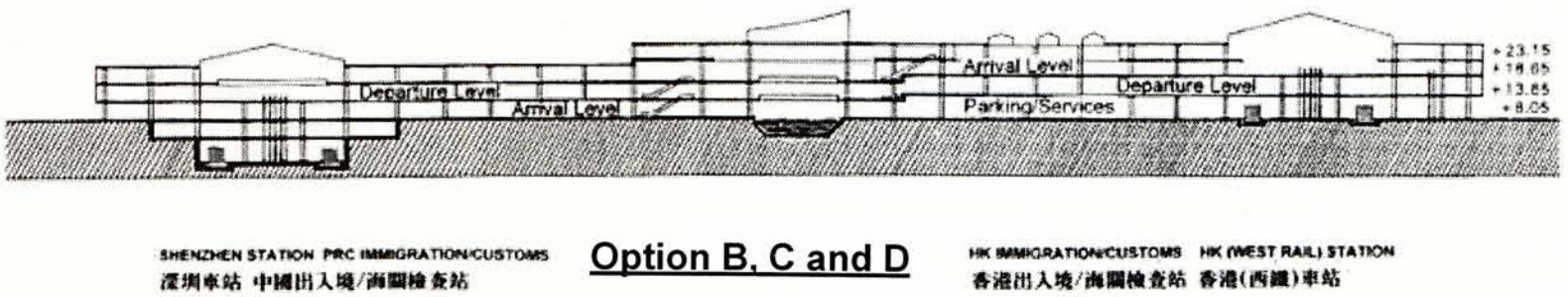
In order to integrate the proposed congress center into the Huanggang Station, they are mainly divided into two building plan organizations. The proposed compositions are as the followings:




**Option A**

This is a scheme corresponding the Scheme A listed above. Both of the Stations will have on the ground level railway. The proposed congress center and the customs service will locate on top of the linking bridge.

## Site Selection And Context




**Option B, C and D**

This is a scheme correspond the Scheme B, C or D listed above. The Lok Ma Chau Terminal will be designed on the ground level. However, the Huanggang Station will be located underneath the ground level. The proposed congress center will be treated as the property development above the Huanggang Station. Moreover, the Customs Departments will be integrated inside the Lok Ma Chau Terminal building.

Nevertheless, such scheme is obviously more complicated in term of circulation design and at the same time it do not have enough land to situate so many conflicting programs into one building. Furthermore, it does not have the exciting spiritual experience to walk across the river from one side of the border to the opposite one.

In conclusion, the site of Scheme A will be chosen because it can allow the people to walk across the Borderline which will provide a symbolic and spiritual excitement. Moreover, it is a simpler building plan organization compared to the other scheme. Finally, it has more space to allow so many conflicting programs integrate into one building.

**Site:**

Lok Ma Chau is chosen because, (a) it is a symbolic place joining the two places and hence the people. (b) There is a future railway development and also existing highway connect to the proposed congress center, and hence it will ease the transportation for both goods and passengers to reach to the site. (c) The Huanggang Station is located at the busy center of Shenzhen where would have close relationship to the heart of city of Shenzhen. It is a place both are convenient for people and transportation.

## Design Objectives

To realize the potential of the future development happened in Pearl River Delta especially in Shenzhen and its influence and potential toward Hong Kong that works with Shenzhen in the partnership form continuously even in future. Through the introduction of the proposed congress center, it will act as a symbolic and physical mean of helper in such relationship of union.

### Issues to Research

(a) Topography of the site that will be studied by the time of site visiting at the beginning of the project.
(b) Typologies of the architecture at the site, which will affect the form and structure of the proposed building and the information, will be collected in the site visiting. The research will be held at the beginning of the site analysis.
(c) Study the form and spaces needed to suit the project promotions and discussion especially for the hi-technology products.
(d) Forecast the planning of the whole business community and the relationship between the proposed congress center and the nearby facilities.

### Objectives of Architectural Design

(a) Contextual Studies of the context with two different cultures at one place. Solving the symbolic meaning of the place. How it adapts to the existing community. The study of how it connects with the city center of Shenzhen. It should also consider the connection to the supporting facilities such as hotel and office towers adjacent to the proposed congress center.
(b) Building Design: Studies how to join the different conflicting programs together especially the relationship between two stations, the custom services, the proposed congress center and the outdoor transportation terminal.
(c) Community Studies: Studies of the community functions in the spaces between the proposed stations and the congress center.
(d) Structure and Service System: Studies the structural and mechanical system challenges held in the larger rooms like the congress halls and the stations.

## Users Profile

### Congress Center:

Major users of the congress center will be from the organization of both Governments and also from the business parties. It also welcome any foreign companies that are interested in invest in Shenzhen or to promote their products to Shenzhen people.

It will also be the functioning hall for the activities held at the community of Shenzhen. Therefore, the communities of Shenzhen will also participate in the programs.

### Railway Station and Custom services:

It will connect to the new transportation system connecting the Mainland China and Hong Kong for passengers. Moreover, the custom services will integrate to the Congress Center for the people who need to cross-border to the other side. It will hope to help development of the economy of both Hong Kong and China.

## Management

The site for the proposed Lok Ma Chau Congress Center is on top of Shenzhen River between the Futian District of Shenzhen and Lok Ma Chau of Hong Kong. It is because it is on the cross border area between two places, half of the ownership will belong to Hong Kong and the other half ownership belongs to Shenzhen.

However, the client of the proposed congress center is Hong Kong Trade Development Council. Therefore, the ownership of the congress center will belong to Hong Kong and it welcome Shenzhen and other area in Mainland China to rent it for any business and cultural purposes.

## Planning (Statutory) Constraints

**Draft San Tin Outline Zoning Plan (Existing Stage) No. S/YL-ST/1**

The site is in the area of San Tin. The following are the stated existing planning constraints:

From Notes (v), Except if and so far as the respective zone otherwise provides, the following developments and uses are always permitted on land within the plan area and no planning permission is required :-

(d) Geotechnical works, local public works, road works, sewage works, drainage works, environmental improvement works, marine related facilities and waterworks installation excluding service reservoir carried out by government departments.

(i) in any area shown as "Road": central divider, driveway, elevated road, on-street car park, car park, cycle park, rail station and stop, footbridge, rail track, road tunnel, subway and footpath,

In conclusion, it could repair the "seabed" and develop the site formation two banks of Shenzhen River without planning permission.

It is because in future development, KCRC will develop Lok Ma Chau Terminal and the footbridge to connect to the Shenzhen Huanggang Station, the Lok Ma Chau Terminal will in turn provide the entrance to the proposed congress center, it could develop the railway terminal to support the proposed congress center without permission.

Under Notes,

(viii) Without prejudice to paragraph. (ii) above, all works relating to roads, junctions, nullahs, sewers, drains, rail tracks, other than those carried out by government departments, require permission of Town Planning Board.

Therefore, the railway and roads develop to reach the site for railway station and the car parking area related to the project will not require permission of the Town Planning Board as it is going to be develop by government departments.

(xii) Notwithstanding that a development or use is in accordance with these Notes or that permission bas been obtained from the Town Planning Board pursuant to section 16 of the Ordinance, such development of use to be carried out must also comply with the conditions of the relevant Government lease and/ or the provisions of any other legislation.

## Planning (Statutory) Constraints

### Schedule of Uses

The proposed Lok Ma Chau Congress Center belongs to the area of Conservation Area, Column 2 (uses that may be permitted with or without conditions on application to the Town Planning Board), Government Use (not elsewhere specified).

Therefore, the proposed Lok Ma Chau Congress Center need to have permission from the Town Planning Board.

### Explanatory Statement

Under (6) Opportunities and Constraints,

(6.1) Opportunities;

(6.1.1) The western part of the planning area is dominated by fish ponds with close proximity to the Mai Po Nature Reserve which is an important wetland reserve. The Mai Po Nature Reserve is designate as a restricted area under Chapter 170-Wild Animals Protection Ordinance and it is currently under the management of the Agriculture and Fisheries Department and World Wild Fund for Nature Hong Kong. Whilst conservation of the Mai Po Nature Reserve imposes a constraint on development, it also presents opportunities to preserve this natural resource for educational purpose, scientific research as well as eco-tourism and development of compatible recreational uses for the general public.

(6.2) Development Constraints;

(6.2.1) The Mai Po Nature reserve and the Mai Po Egretry, which are in the vicinity of the Area, form part of the wetland system in the Deep Bay area providing an extensive area of undisturbed feeding and resting habitats for migratory birds. In order to preserve and sustain Mai Po Reserve and the wildlife habitats in the vicinity of the Area, new development should not be allowed unless it can be demonstrated that it would have minimal adverse impact on the ecological well-being of the Mai Po Nature Reserve.

(6.2.2) The western part of the Area is low-lying and over the past thirty years, there have been substantial modifications of the floodplain, therefore reducing the flood storage capacity and affecting floodways and watercourses in the Area. These changes have caused substantial increase in flooding hazards and flood damages to the Area.

**Planning (Statutory) Constraints**

(7) General Planning Intention;

(7.1) The planning intention of the Area is to preserve and sustain Mai Po Nature Reserve which is suggested to be included as a Wetland of International Importance under the Ramsar Convention. While human activities or urban development are to be discouraged in areas within vicinity of this Nature Reserve, uses that are in line with the concept of conservation of Mai Po Nature Reserve such as educational, scientific research and eco-tourism and compatible recreational uses for the general public are preferred. To strike a balance between conservation and development, a gradation approach to development has been adopted for the Plan. In other words, the degree of control for development will be relaxed on areas further away from the Nature Reserve provided that any development/redevelopment should have insignificant impact on the Nature Reserve.

(7.2) In the designation of various zones in the Area, considerations have been given to the natural environment, physical, existing settlements, availability of infrastructure and local development pressures, Territorial Development Strategy and NWNT Development Strategy Review. Other than the above, buildings and sites of historical and archaeological interest have been preserved in the Area as far as possible.

In conclusion, in order to respect the Mai Po Nature Area, the proposed Lok Ma Chau Congress Center should have low profile and have height limit. Moreover, the building and the area around the building should be developed as an natural landscape area so that it still keep the nature character of the Area.

Furthermore, in order to prevent the area from flooding, the development should minimize the interference to the flow of water rate and hence it should have minimum structure on the river.

It should include the improvement of the River condition such as deepen the seabed to ease the water flow as convenience.

**Planning (Statutory) Constraints**

(8) Land Use Zoning;

(8.8) Undermined (U);

(8.8.1) An area to the ease of San Sham Road is zoned "U" as there is a possible railway proposal which would run through the area as recommended by the draft final report of the Railway Development Study. At present, this area mainly consists of container trailer parks, warehouses, agricultural land and some village houses. In view of its proximity to the Lok ma Chau border-crossing, any development has to be comprehensively planned. This is because piecemeal developments/redevelopments would jeopardize the future overall planning of the San Tin area. In view of the above, it is proposed that the area be zoned "U" pending finalization of the Study and the preparation of the layout plan to guide development/redevlopment in an orderly manner.

(8.8.2) Under the "U" zone, any private developments or redevelopments are required to prepare master layout plans for approval of the Board to ensure that the environment would not be adversely affected and that infrastructure, G/IC, open space, etc. are adequately provided. The master layout plans should also take into account the possible railway proposal as suggested by the Railway Development Study being finalized. To realize a built form which is compatible to the surrounding, the development intensity should take into account the rural characteristics of the surrounding areas.

Therefore, a special and comprehensive master layout plans and the schematic build form, elevations and height of the proposed congress center must be submitted to Town Planning Board for approval for the purpose of preserving the rural characteristics of the surrounding areas.

## Planning (Statutory) Constraints

### Territorial Development Strategy Review, Foundation Report 1993

Inside the report, there are some special topics mentioned about the development on the future Lok Ma Chau cross-border area.

Rural Land Use

Land uses in Border Areas- the future use in Border Areas needs to be considered in response to demand for non-rural uses generated by increasing cross-border communications and economic activities. On the other hand, there is a need to maintain an effective natural buffer zone between the NT and Shenzhen Special Economic Zone (SSEZ) for security reasons.

Principles in Formulation of a Rural Land Use Strategy

The majority of the Border Closed Areas should be retained for agricultural use, landscape protection area, and buffer zone for landscape/conservation and security reasons. Cross border uses such as transit area, marshaling yard, etc. should be confined to the close vicinity of the four border crossings at Lok Ma Chau, Lo Wu, Man Kam To and Sha Tau Kok.

### Other Statutory Constraints

Since it is on top of the Shenzhen River and is near by the sensitive area of Mai Po Conservation Area, there area some planning regulations may direct the design of proposed congress center.

For the Building Design

- Building (Administration) Regulations-Chapter 123
- Building (Planning) Regulations-Chapter 123
- Town Planning Regulations-Chapter 131

For the Construction Purposes

- Construction Sites (Safety) Regulations-Chapter 59

It would obviously affect the construction conditions since it is constructed on top of the river and hence it involves special condition of the construction site.

Moreover, it will involve the security problem during the construction period. Therefore, the management and security arrangement of the construction site need to be co-ordinated with the Hong Kong Police, Shenzhen Police and Custom Departments from two places.

For the Site Formation and Seabed Improvement

- Waterworks Regulations-Chapter 102

**Planning (Statutory) Constraints**

For the Disposal of Waste, Environmental Issues

- Water Pollution Control (General) Regulations-Chapter 358
- Waste Disposal Ordinance-Chapter 354
- Building (Standard of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations-Chapter 123

Since the proposed site is a very sensitive in term of water quality as it would affect the natural qualities of the nearby Mai Po Area and the natural area around.

This also need to co-ordinate with Drainage Department and comply with the regulations from Environment Protection Department to resolve the drainage system for the North West new Territory. Planning proposals must be get approval for Environment Protection department and Drainage Department.

**Lease Conditions (General and Special)**

Since it is on the sensitive cross border site and it is developed by Government, it do not have lease conditions

However, it do have general and special planning conditions and strategies.

- The proposed congress center start at the +15.5m from the principal datum.
- The height limit for the proposal should be under +60m from the principal datum.
- The transit area, marshalling yard, etc. should be confined to the close vicinity of the border crossings at Lok Ma Chau.
- The circulation design for the cross border facility should be wide and clear enough to accommodate the estimate mass of people to cross the border.
- The arrival and departure passengers should be separate in two levels.
- The bank of the river sides should be developed as buffer zone by landscape to act as the security control zone.
- The visitors and the cars must be checked by the custom departments before entering and leaving the proposed center for security reason.
- The building form should respect the nearby natural environment.
- It should minimize the interference to the water flow rate of Shenzhen River. Minimum structure should be constructed into the River.
- The construction of superstructure should be on site at winter and spring as it is less like to have heavy rain which will need to be drained away by River to avoid flooding.

- Private car parking should be provided for both Custom department. Lok Ma Chau Terminal and proposed congress center.
- Waste and water disposal treatment should meet the regulations standard of Drainage Department and Environment Protection Department.

## Planning (Statutory) Constraints

### Car Parking Provision (From H.K. Planning Standard & Guidelines)

According to the H.K. Planning Standard & Guideline,

Parking Requirements

- Not less than 1 single-deck tour bus parking space for every 200 guest rooms or part thereof. Access to and egress from parking areas should be from a minor road within the confines of the site.
- Not less than 1 car parking space for every 10 guest rooms. Provision is subject to any Closed Road Permit policies.
- Additional provision for convention centers and banquet facilities to be determined by the Authority.

Loading/Unloading Requirements

- Not less than 1 bay for lorries for 100 guest rooms or part thereof.
- Additional provision for convention centers, banquet facilities to be determined by Authority.

## Schedules of Accomodation and Building Cost Estimate

### Trade Development Council Congress Center:

| Programs | Area (Square Meter) | No. of People |
|---|---|---|
| Exhibition and Convention Hall | (45+50) x 35 = 3325 sq.m | - |
| Kitchen for Banquet Use | (17+20) x 20 / 2 = 370 sq.m | - |
| Large Auditorium | 23 x 26 = 598 sq.m | 553 |
| Small Auditorium | 23 x 24 = 552 sq.m | 503 |
| 8 Meeting Rooms | 8 x 9 x 10 = 720 sq.m | 8 x 12 |
| 4 Coffee Corners | 4 x 5 x 10 = 200 sq.m | - |

### TDC Office and Library:

| | | |
|---|---|---|
| 4 TDC Reference Library | 4 x 23 x13 = 1196 sq.m | 30 |
| General Staff Offices | 4 x 25 x18 = 1800 sq.m | 35 |
| 2 Reception and meeting areas | 2 x 15 x15 = 450 sq.m | 15 |
| 4 Guest Rest Rooms | 4 x 10 x 6 = 240 sq.m | 4 x 5 |
| 2 Coffee Corners | 2 x 10 x 15 = 300 sq.m | 2 x 6 |

### Supporting Facilities:

| | | |
|---|---|---|
| Restaurant / Fast Food Shops | 4 x 30 x 20 = 2400 sq.m | 4 x 150 |
| Retails Shops Floors | 7680 sq.m | - |

## Schedules of Accomodation and Building Cost Estimate

Exhibition Hall Parts

G.F.A. of Exhibition Hall, Auditoriums and Banquet Hall (including Kitchen)
= 5765 sqm.

Mechanical Area (including toilets) = 5765 x 20%= 1153 sqm.

Circulation Area (including Reception Foyer of Exhibition Hall)
= (5765 + 1153) x 20% = 1383.6 sqm.

Total G.F.A. of the Exhibition Parts
= 5765 + 1153 + 1383.6
= 8301.6 sqm.

Office Tower Parts

G.F.A. of the Office and Reference Library
=3986 sqm.

Mechanical Area (including toilets) = 3986 x 15%= 597.9 sqm.

Circulation Area (including Cross Border Corridor)
= (3986 + 597.9) x 20% = 916.78 sqm.

Total G.F.A. of the Office and Conference Parts
= 3986 + 597.9 + 916.78
= 5500.68 sqm.

Car Parking

No. of Tourist Buses Parking = 2 (1 for HK and 1 for Shenzhen)
No. of Underground Car Parking = 400 units. (200 at H.K. and 200 at Shenzhen).
No. of Lorries Loading Bays = 10 (5 for HK and 5 for Shenzhen)

From the " New Metric Handbook (Planning and Design data)",

Area for 1 private car lot = 2.4 x 4.9 m = 11.76 sqm.
Total G.F.A. for the underground car parking = 400 x 11.76 = 4704 sqm.

Area for 1 tourist bus lot = 11.4 x 5 m = 57 sqm.
Total G.F.A. for the tourist buses parking = 2 x 57 = 114 sqm.

Area for 1 lorry loading dock = 15 x 5 m = 75 sqm.
Total G.F.A. for the lorries loading docks = 10 x 75 = 750 sqm.

## Schedules of Accomodation and Building Cost Estimate

### Building Construction Cost

From the Standard Method of Measurement SMM 7 by Davis Langdon & Seah Hong Kong Limited , the Building Cost for the proposed congress center (data refer to the first quarter of 1993), and the proposed congress center construction will be started at the same phase with the construction of Lok Ma Chau Terminal.

The Lok Ma Chau Terminal will be constructed on site at about winter of 2006 and it take about 5 years to finish. Assume all the construction cost will be paid at the middle stage of the construction period, i.e. 2nd quarter of 2009. The inflation rate at 1995 is 1.2% (compounded) per month. It is assumed that the inflation rate from 1993 to 2006 is similar and about the same of 1.2%.

Exhibition Center parts is similar to the Theaters (over 500 seats) including seating and stage equipment.

The building cost at 1st quarter of 1993 is HK$10300 per sqm.
Therefore, the building cost at 2nd quarter of 2009,
$= 10300 \times (1 + 1.2/100)^{207}$
= HK$121675.55 per sqm.

Therefore, the construction cost for the Exhibition Parts,
= 8301.6 x 121675.55
= HK$101,0101,746

Office and Conference Tower Parts is similar to the Prestige/Headquarters Office, 5 to 10 storeys, air conditioned

The building cost at 1st quarter of 1993 is HK$8700 per sqm.
Therefore, the building cost at 2nd quarter of 2009,
$= 8700 \times (1 + 1.2/100)^{207}$
= HK$102774.49 per sqm.

Therefore, the construction cost for the Exhibition Parts,
= 5500.68 x 102774.49
= HK$565,329,581.7

For the 400 no. underground carparking,
The building cost at 1st quarter of 1996 is HK$6900 per sqm.
Therefore, the building cost at 2nd quarter of 2009,
$= 6900 \times (1 + 1.2/100)^{171}$
= HK$53053.83 per sqm.

Therefore, the building cost of the underground car parking,
= 4704 x 53053.83
= HK$249,565,216.3

**Schedules of Accomodation and Building Cost Estimate**

For the 10 no. Lorries Loading Docks and 2 no. of Tourist Buses Parking,
The building cost at 3rd quarter of 1994 is HK$3075 per sqm.
Therefore, the building cost at 2nd quarter of 2009,
$= 3075 \times (1 + 1.2/100)^{177}$
= HK$25397.78 per sqm.

Therefore, the construction cost for 10 lorry loading docks,
= 750 x 25397.78
= HK$19,048,338.35

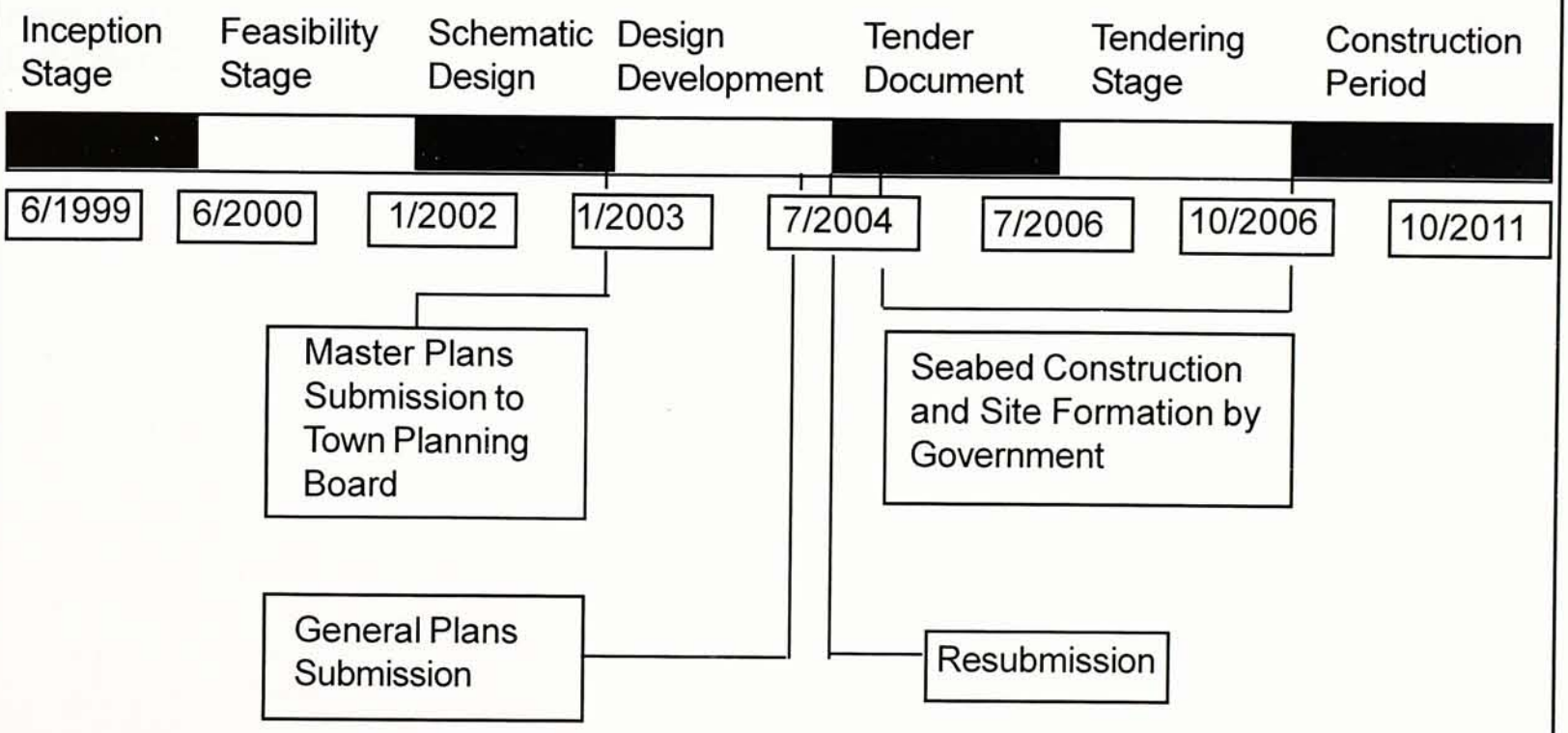
Therefore, the construction cost for 2 tourist buses parking,
= 114 x 25397.78
= HK$2,895,347.43

Therefore the total construction cost for the proposed congress center,
=1,010,101,746 + 565,329,581.7 + 249,565,216.3 + 19,048,338.35 + 2,895,347.43
= HK$1,622,331,230

As the proposed congress center is constructed on the bridge over the Shenzhen River, it involves special construction method. Therefore, the construction cost is much higher than the usual standard construction.

Assume the construction cost is 30% higher than the normal construction, therefore, the estimated construction cost,
= 1,622,331,230 x 130%
**= HK$2,109,030,599**

**Development Programme**



## Project Finance

### Client

The proposed Lok Ma Chau Congress Center will be developed and owned by Hong Kong Trade Development Council.

### Management Committee

Since it is on a highly security cross border area, it needs a special management committee to run the proposed congress center after it is opened.

The joint management committee will include the Custom Departments from both Hong Kong and Shenzhen, KCRC and Shenzhen Metro Company, Hong Kong Trade Development Council. Moreover, Hong Kong Trade Development Council.

The security management of the exhibition center parts will be done by Hong Kong Trade Development Council.

The Custom Departments will be responsible for the entry and exit check point control.

The two stations will be responsible for the arrangement of efficiency and rate of flow of visitors going into the proposed congress center.

### Project Finance

The land cost and the building construction cost for the proposed congress center will be granted by Hong Kong. This is considered to be a similar case of the extension of Hong Kong Convention and Exhibition Center that is also financed by the Hong Kong Government.

Moreover, the seabed and site formation will be also financed and done by Hong Kong Government and it is also similar to the reclamation land of the Extension of Hong Kong Convention and Exhibition Center.

## Professional Fees

In this project, it involves application to Town Planning Board for approval of the project on this sensitive site. At the same time it involves co-ordination and get agreement with KCRC and Custom Department. Moreover, it need to get approval from the Drainage department for the method of construction as the temporary structure to build the bridge of building will be in the water of the River. It may disturb the efficiency of the water flow.

The architect will involve full services of architecture and the procedure will involve the following phases according to the instruction of HKIA.

(a) Inception
(b) Feasibility Studies
(c) Outlined Schematic Proposal
(d) Project design
(e) Contract Documentation
(f) Building Construction

There would involve no standardization in the design. The site formation and improvement of the seabed condition of Shenzhen River will be carried out by Hong Kong Government. After that the project site will hand over to the architect for the construction of the proposed congress center.

According to the HKIA guideline, the complexity of the proposed congress center belong to the Group I Building and because of the construction cost is over HK$800,000,000, hence, the scale of the professional charge is negotiable.

It is assumed that the scale of the professional charge is 4.45% of the construction cost.
Construction Cost found above = HK$2,109,030,599
Therefore, the professional charge,
= 2,109,030,599 x 4.45%
**= HK$93,851,861.66**

| **Working Stage** | **Proportion of fee** | **Fee Payment (HK$)** |
|---|---|---|
| (a) Inception | 5% | 4,692,593.083 |
| (b) Feasibility Studies | 5% | 4,692,593.083 |
| (c) Outlined schematic Proposal | 5% | 4,692,593.083 |
| (d) Project Design | 20% | 18,770,372.33 |
| (e) contract Documentation | 35% | 32,848,151.58 |
| (f) Building Construction | 30% | 28,155,558.5 |
| **Total** | **100%** | **HK$ 93,851,861.66** |

# *Architecture Library*

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